Appendix A

RF Test Data for BT V5.0(BDR/EDR) (Conducted Measurement)

Product Name: Bluetooth speaker

Trade Mark: N/A

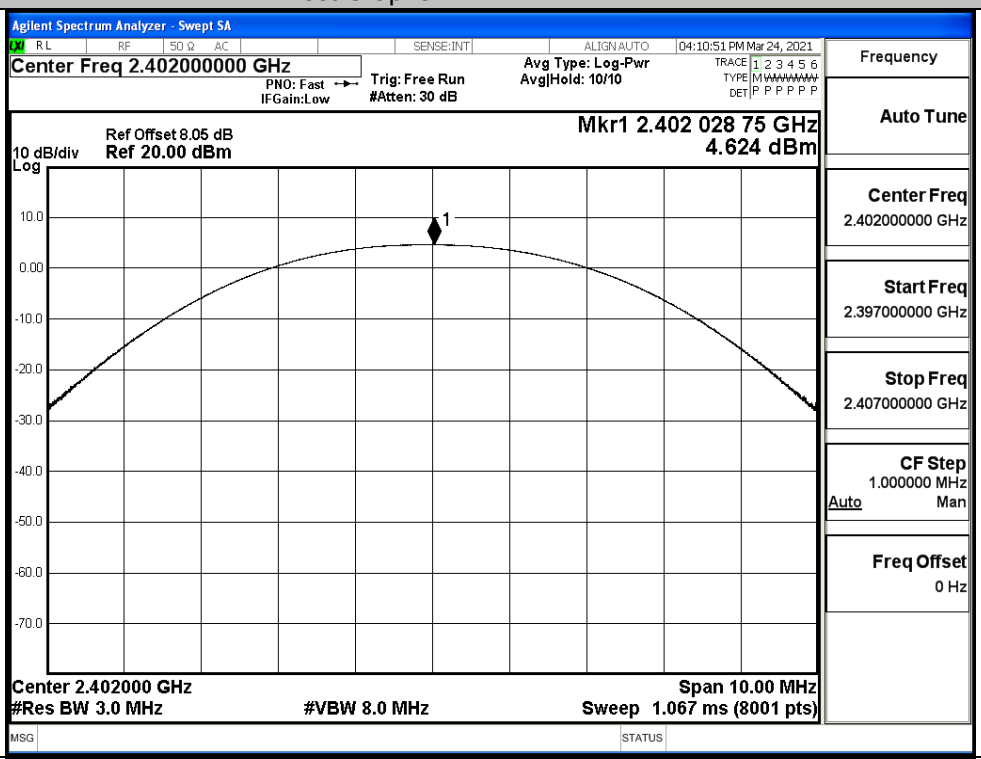
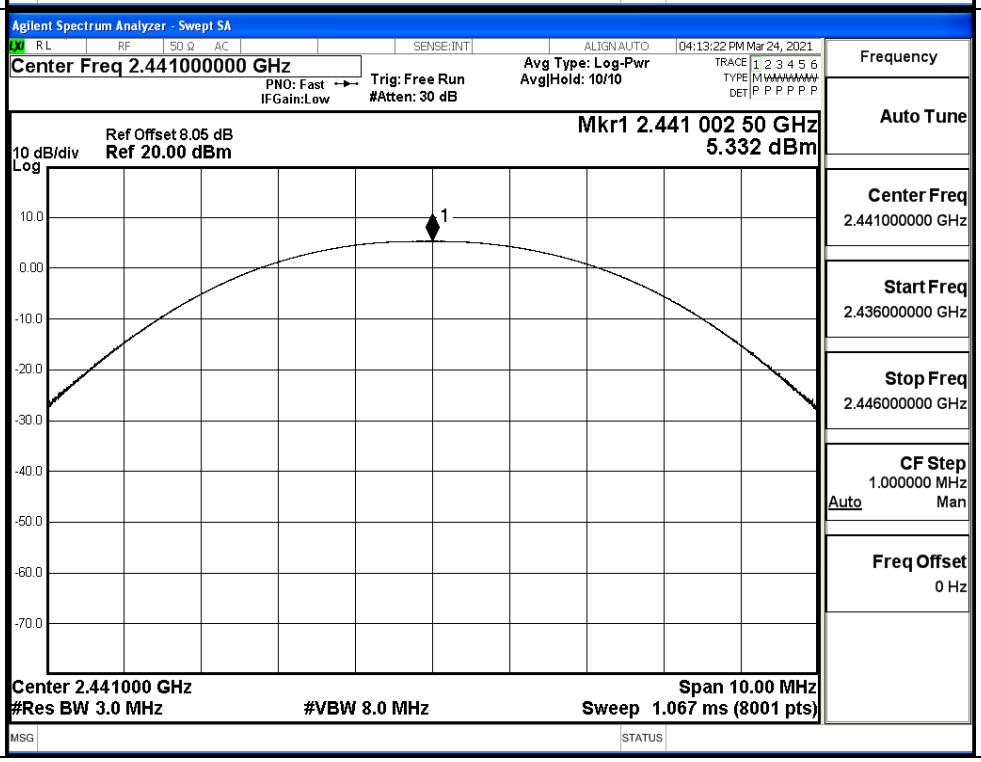
Test Model: SMARTCOM-323

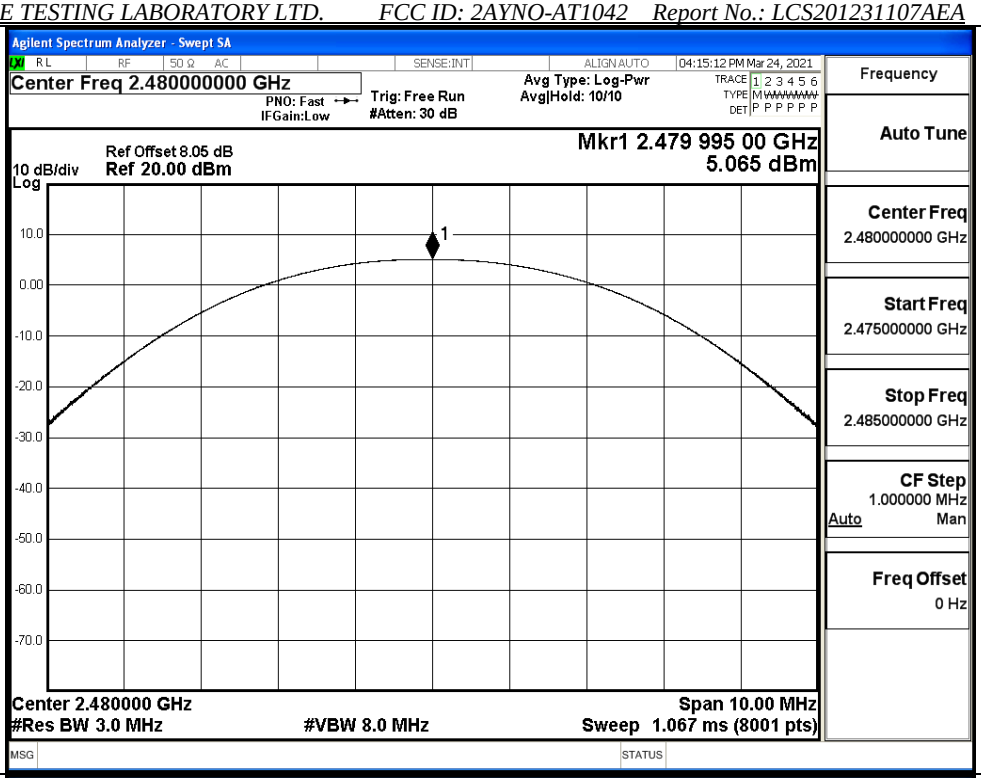
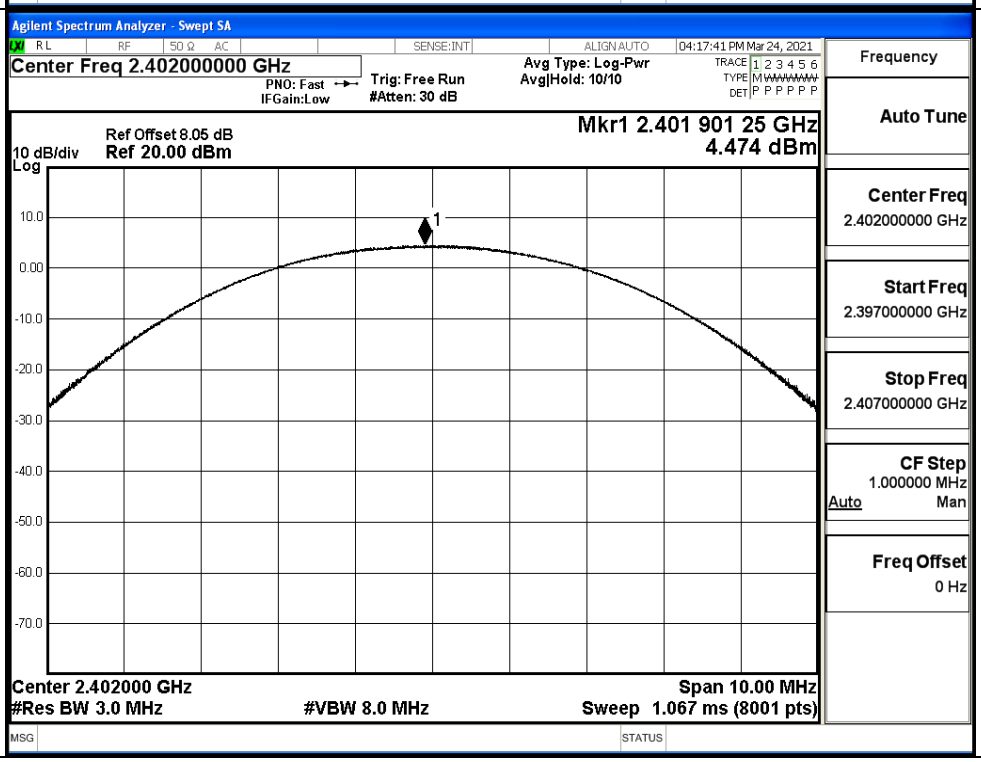
Environmental Conditions

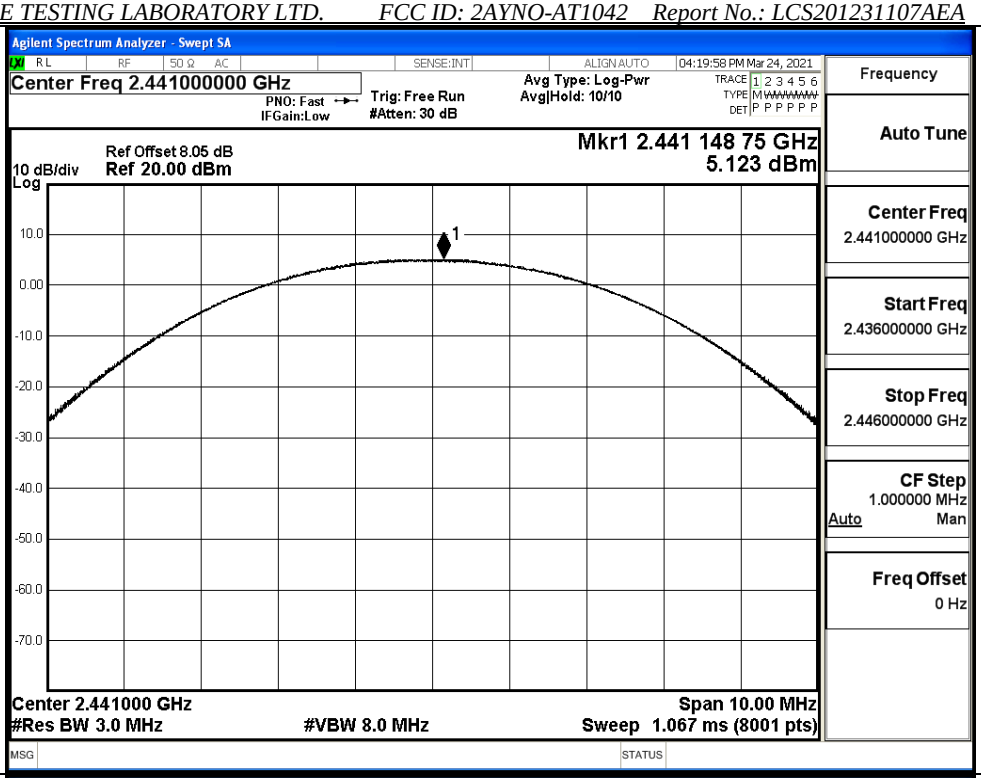
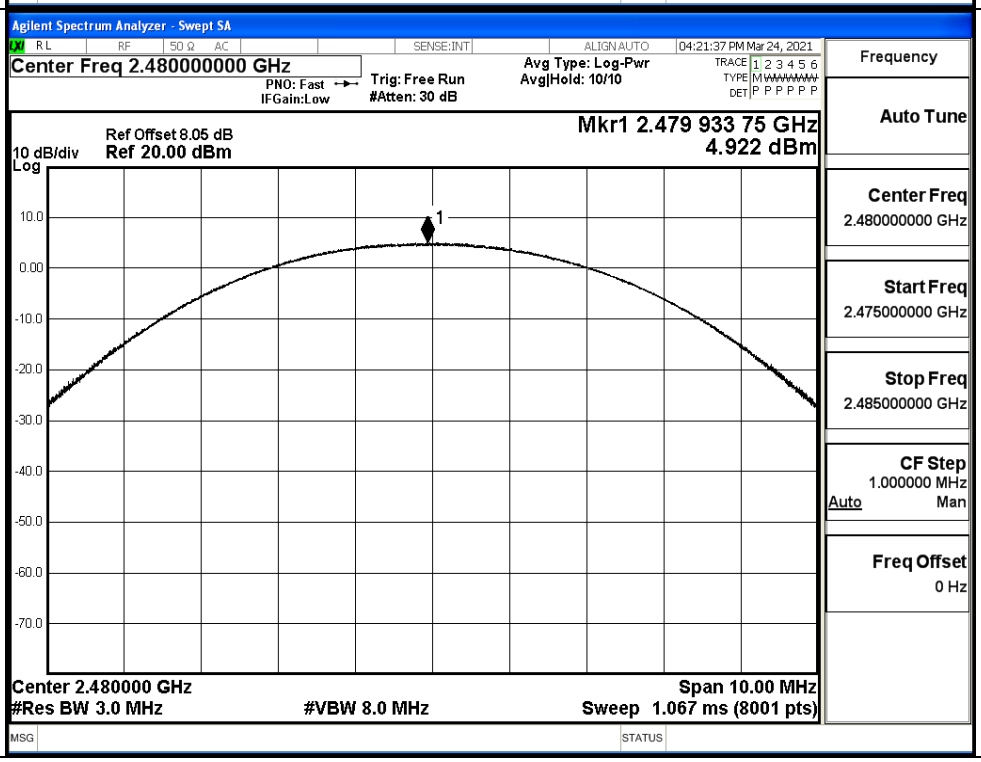
Temperature:	24.6° C
Relative Humidity:	54.1%
ATM Pressure:	100.0 kPa
Test Engineer:	Li Huan
Supervised by:	Li Huan

A.1 Maxmum Conducted Peak Output Power

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	4.624	21	PASS
	MCH	5.332	21	PASS
	HCH	5.065	21	PASS
π/4DQPSK	LCH	4.474	21	PASS
	MCH	5.123	21	PASS
	HCH	4.922	21	PASS

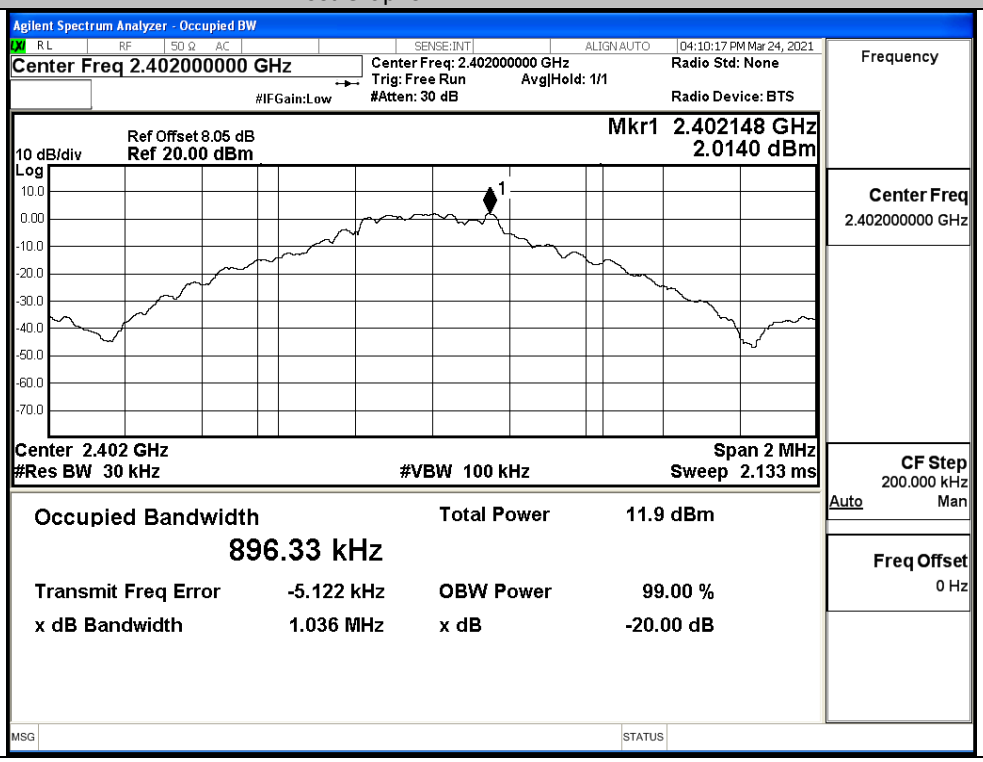
Test Graphs		
GFSK/LCH		
GFSK/MCH		

GFSK/HCH	
π/4DQPSK/LCH	

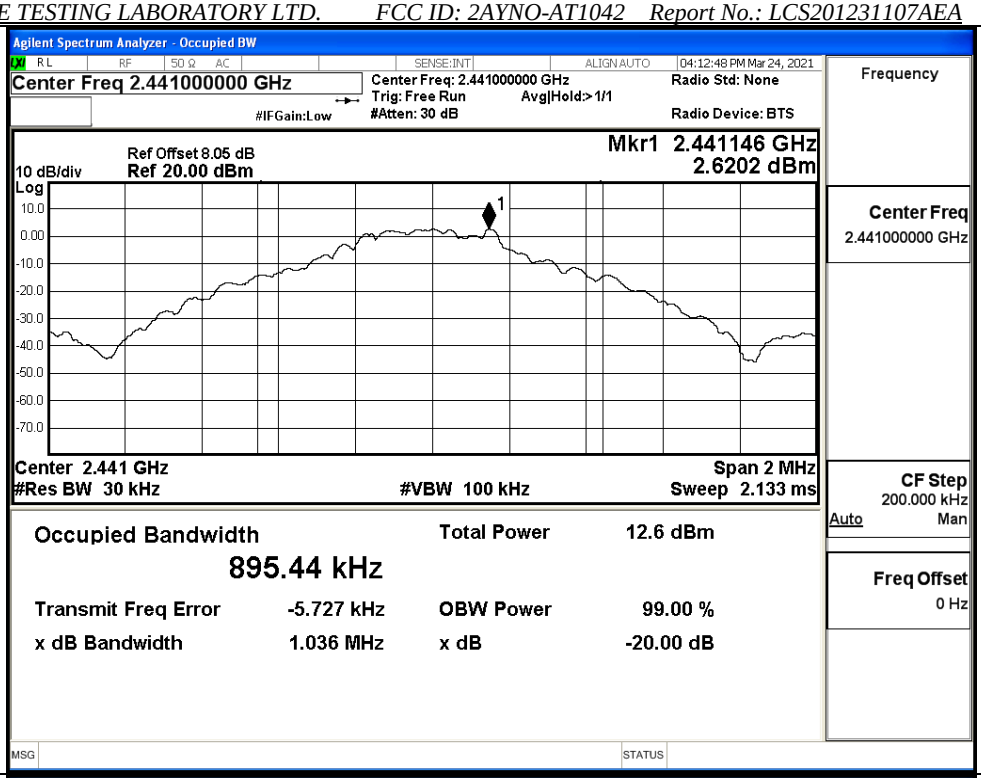
π/4DQPSK/MCH	
π/4DQPSK/HCH	

A.2 20dB Bandwidth

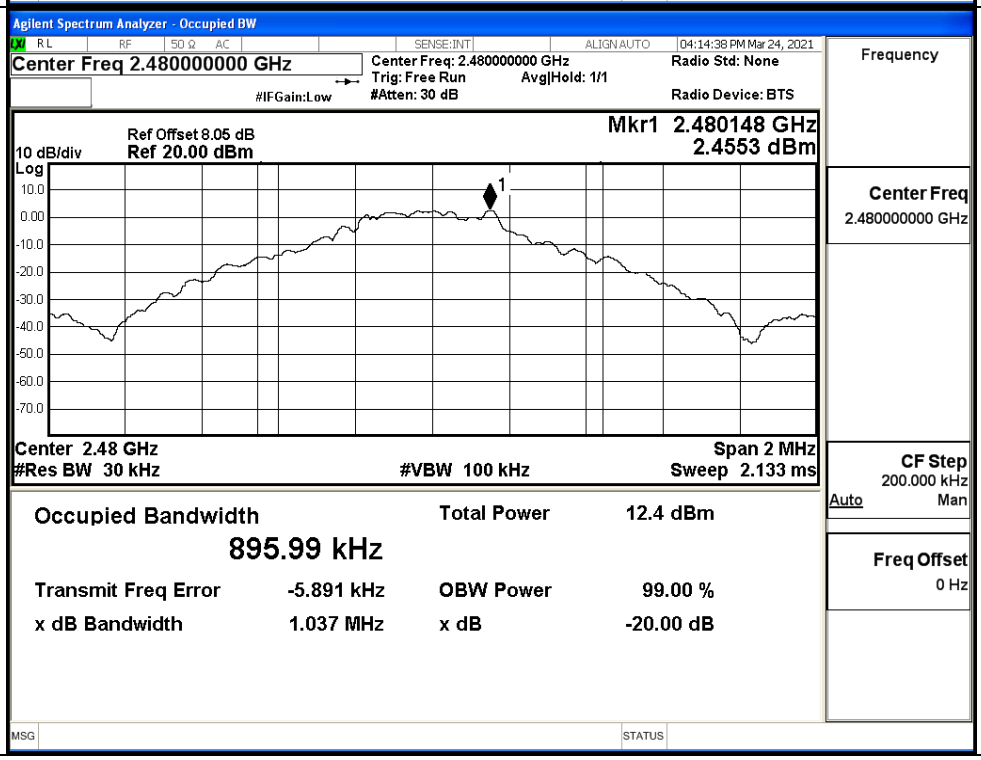
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.036	Not Specified	PASS
	MCH	1.036	Not Specified	PASS
	HCH	1.037	Not Specified	PASS
π/4DQPSK	LCH	1.287	Not Specified	PASS
	MCH	1.287	Not Specified	PASS
	HCH	1.285	Not Specified	PASS

Test Graphs	
GFSK/LCH	

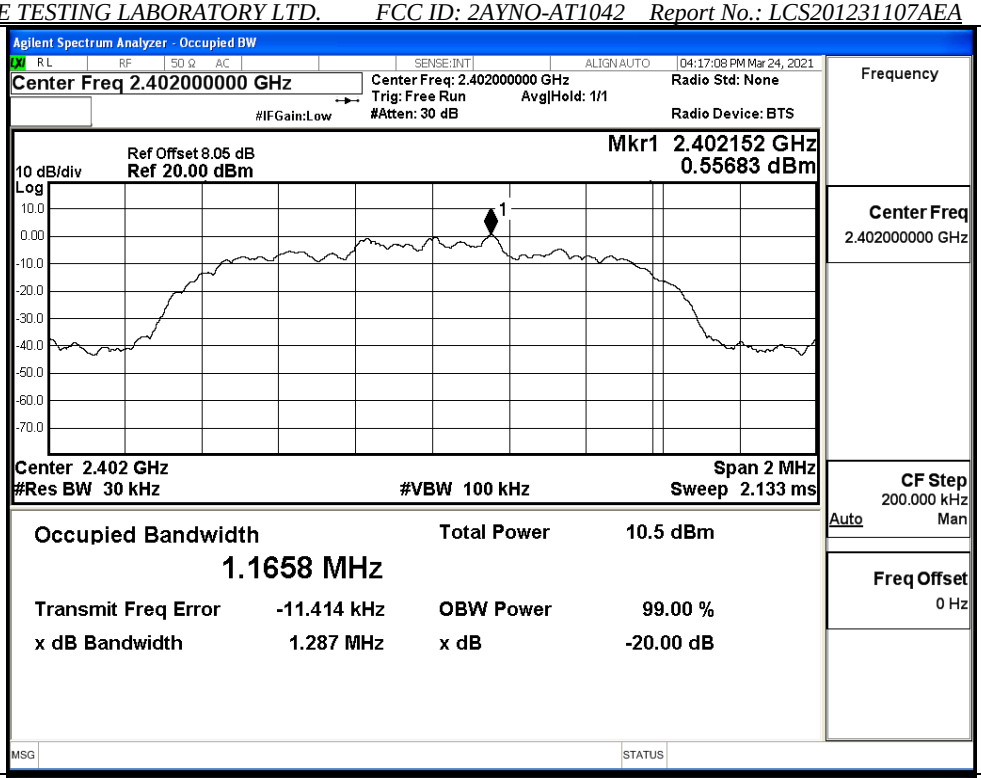
GFSK/MCH



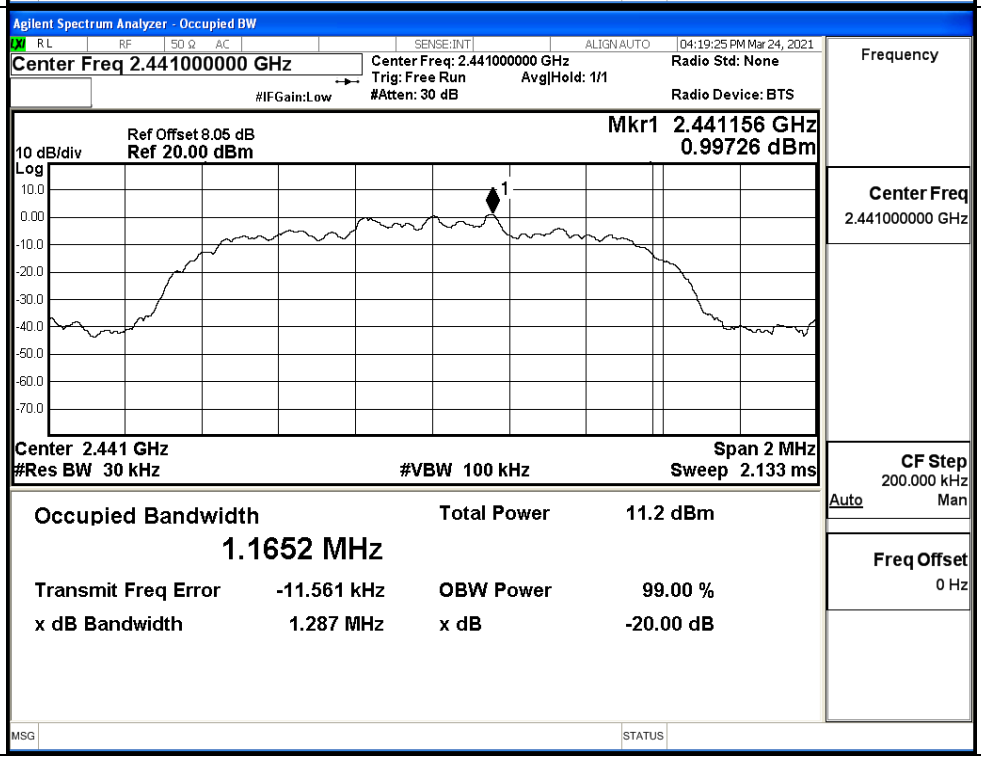
GFSK/HCH



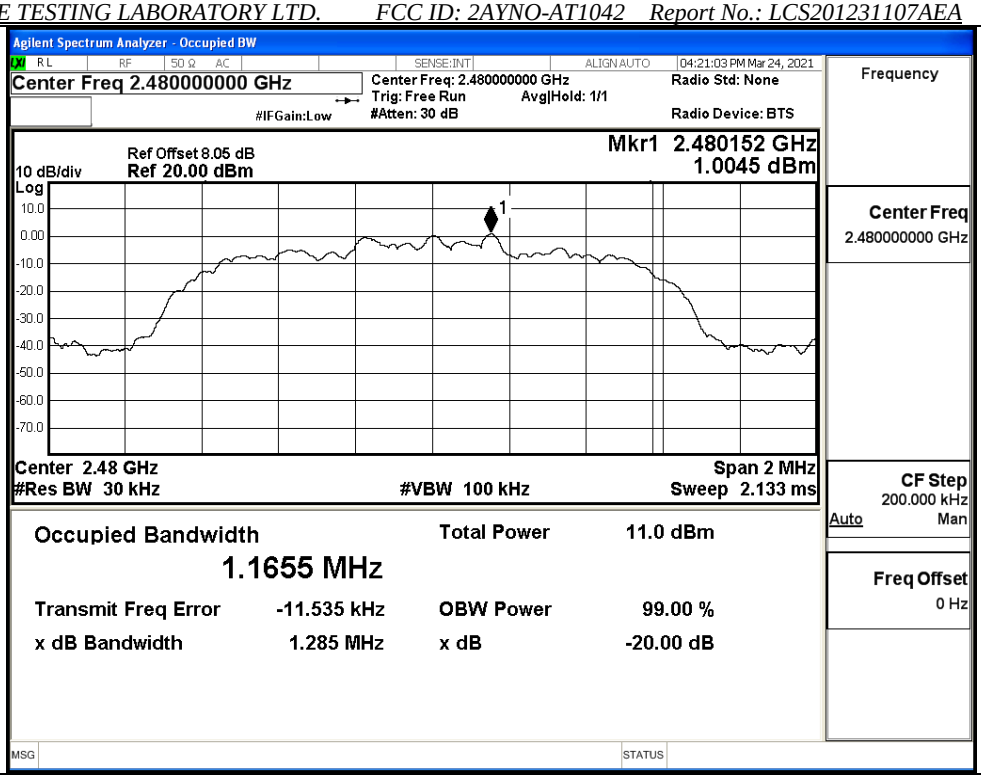
π/4DQPSK/LCH



π/4DQPSK/MCH

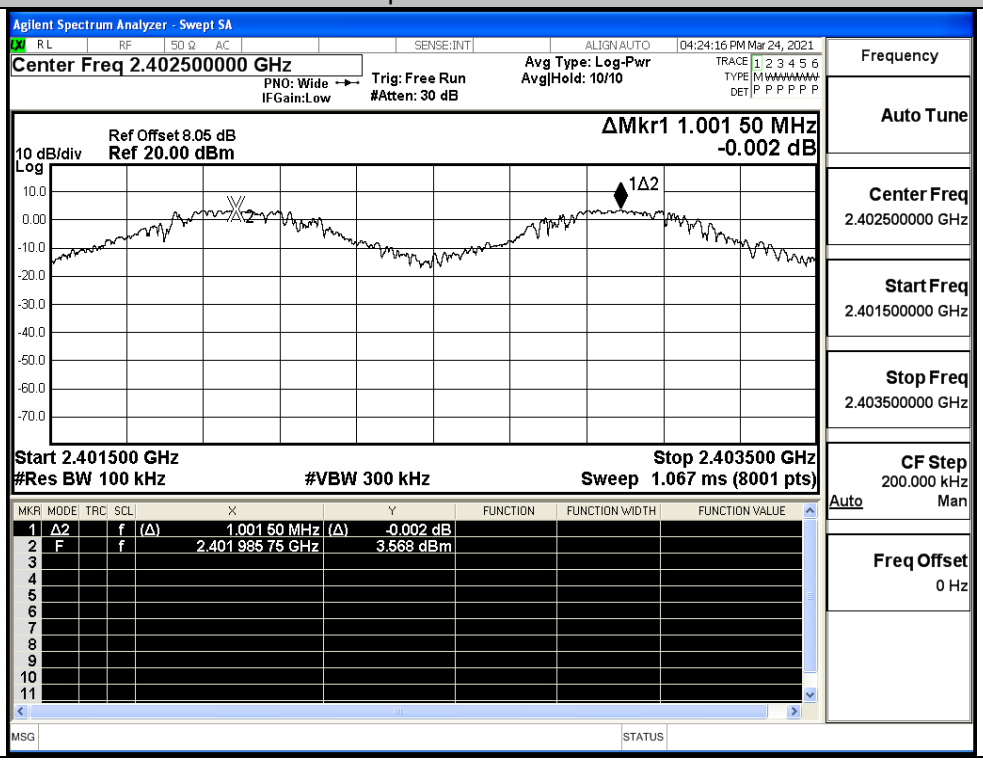


π/4DQPSK/HCH

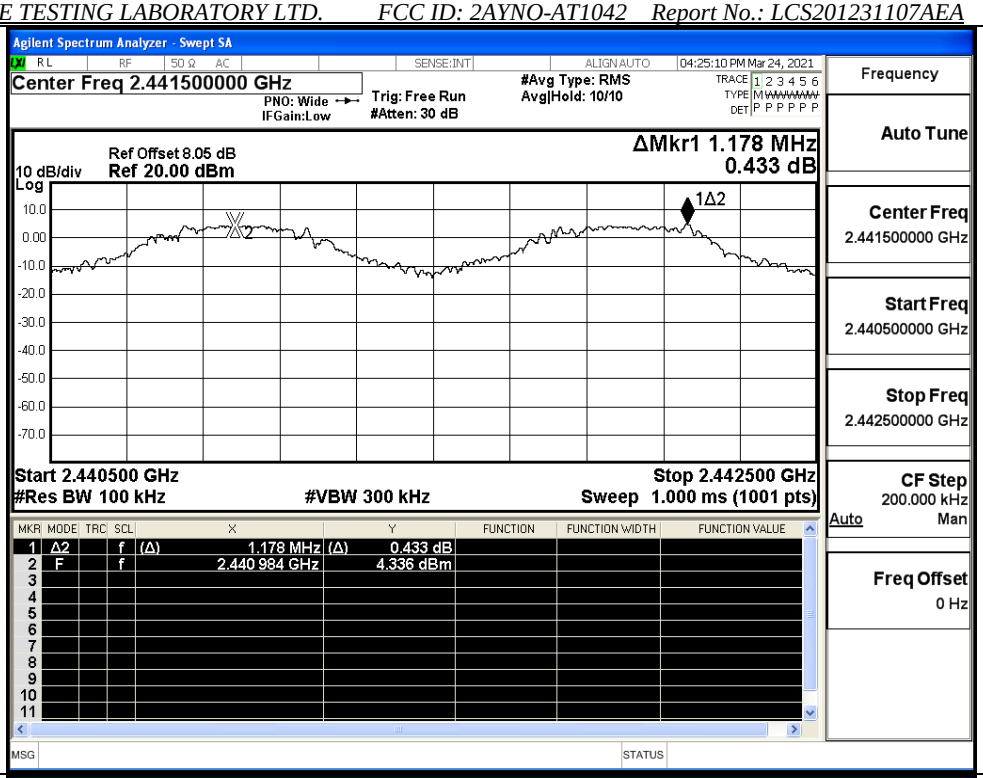

Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.480000000 GHz
Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 1/1
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
04:21:03 PM Mar 24, 2021
Frequency
Ref Offset 8.05 dB
10 dB/div
Ref 20.00 dBm
Mkr1 2.480152 GHz
1.0045 dBm
Center Freq
2.480000000 GHz
Center 2.48 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 2 MHz
Sweep 2.133 ms
CF Step
200.000 kHz
Auto
Man
Occupied Bandwidth
1.1655 MHz
Total Power 11.0 dBm
Transmit Freq Error -11.535 kHz
OBW Power 99.00 %
x dB Bandwidth 1.285 MHz
x dB -20.00 dB
Freq Offset
0 Hz
MSG
STATUS

A.3 Carrier Frequency Separation

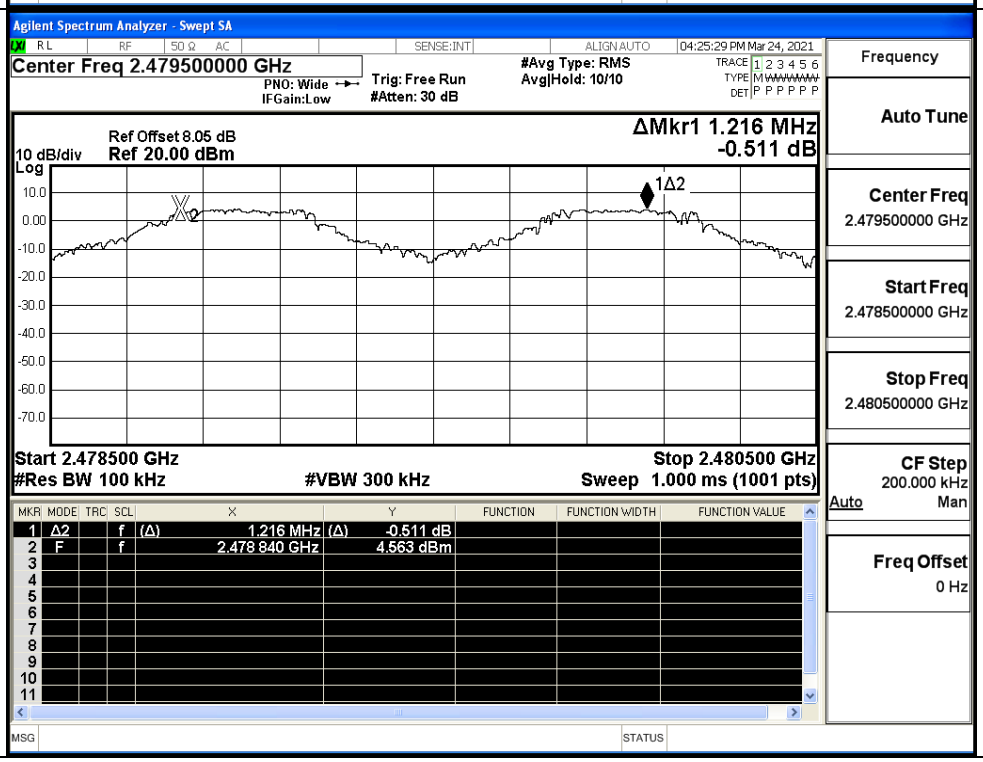
Mode	Channel.	Carrier Frequency Separation [MHz]	Limit [MHz]	Verdict
GFSK	LCH	1.002	0.691	PASS
	MCH	1.178	0.691	PASS
	HCH	1.216	0.691	PASS
π/4DQPSK	LCH	1.322	0.858	PASS
	MCH	1.178	0.858	PASS
	HCH	1.190	0.858	PASS

Test Graphs		
GFSK/LCH		

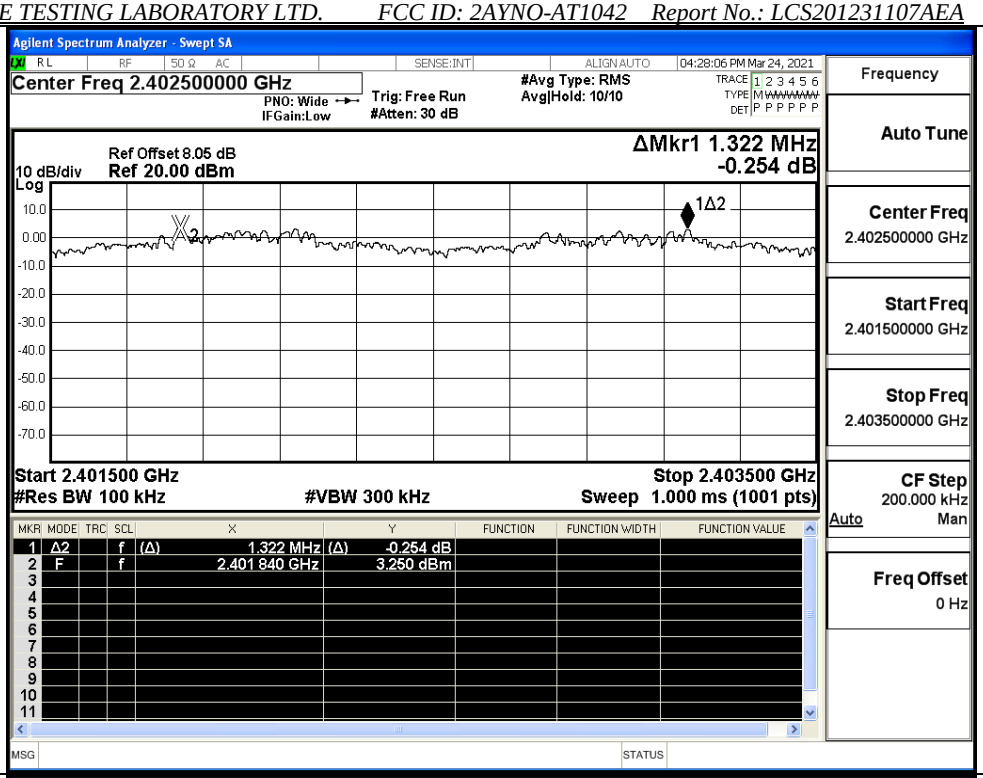
GFSK/MCH



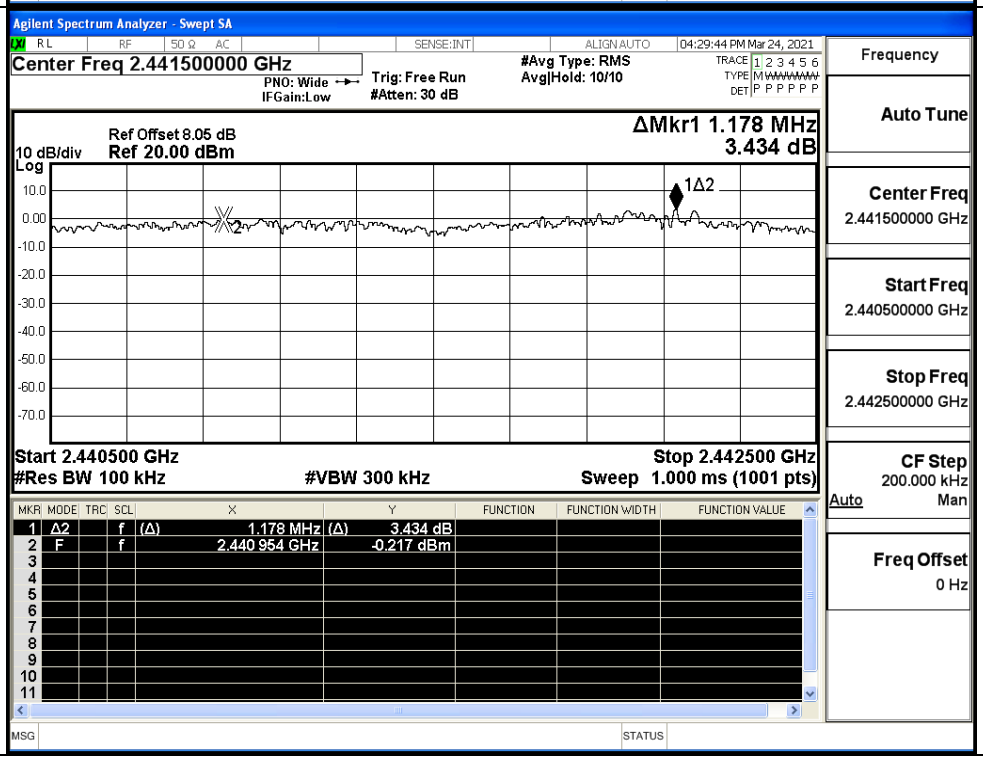
GFSK/HCH



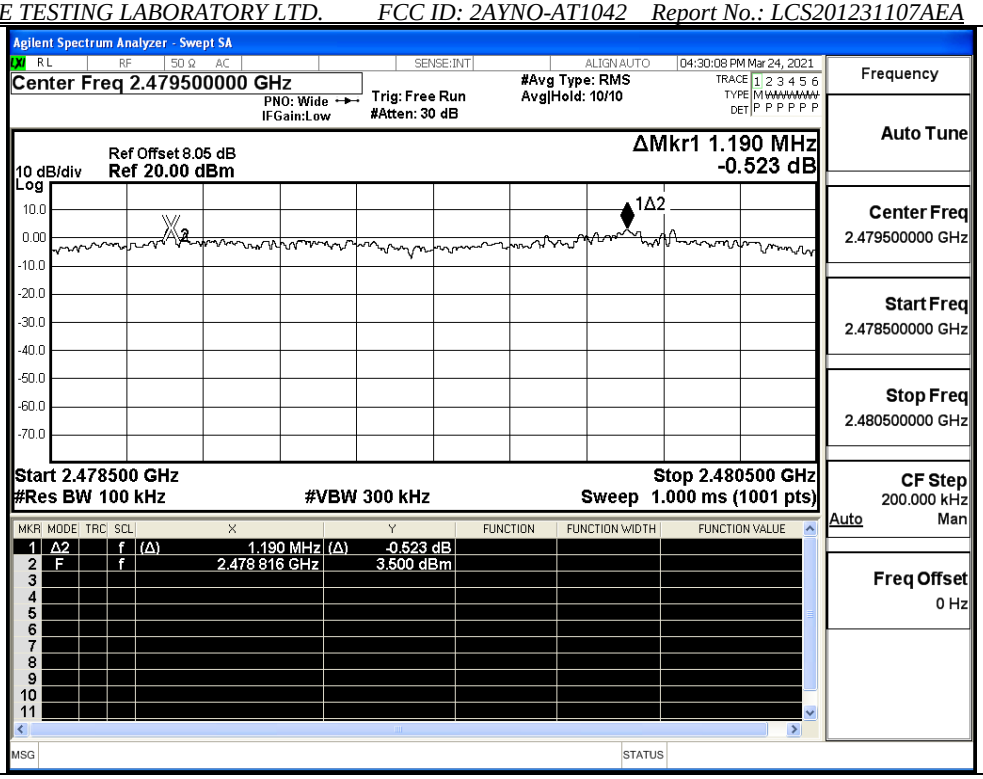
π/4DQPSK/LCH



π/4DQPSK/MCH

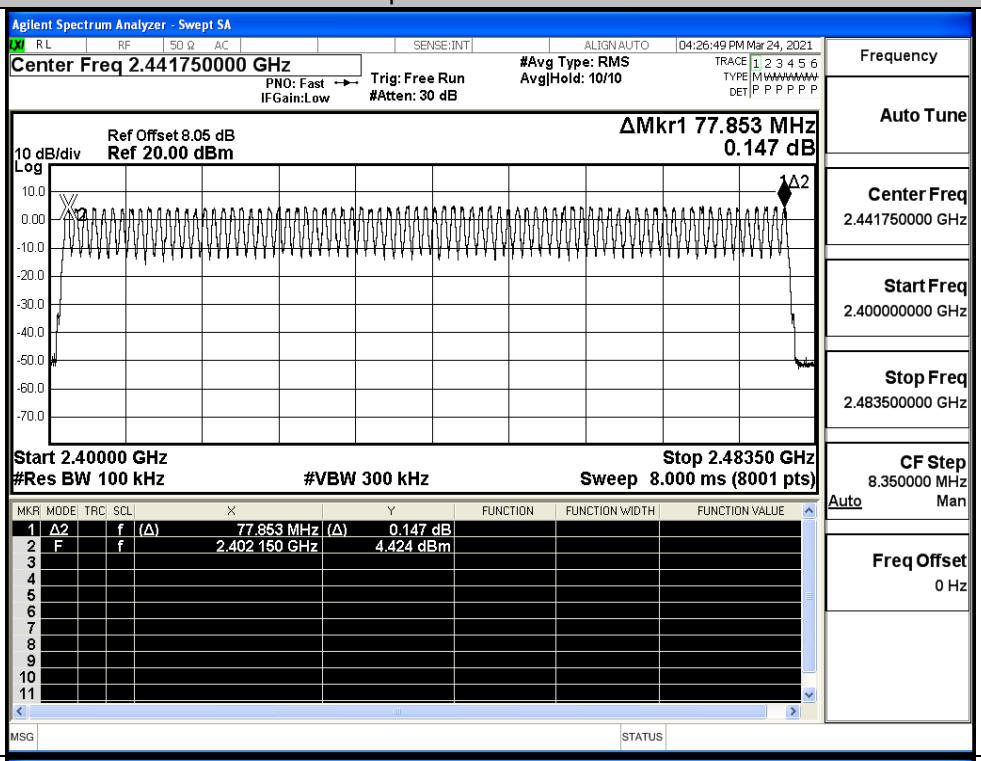
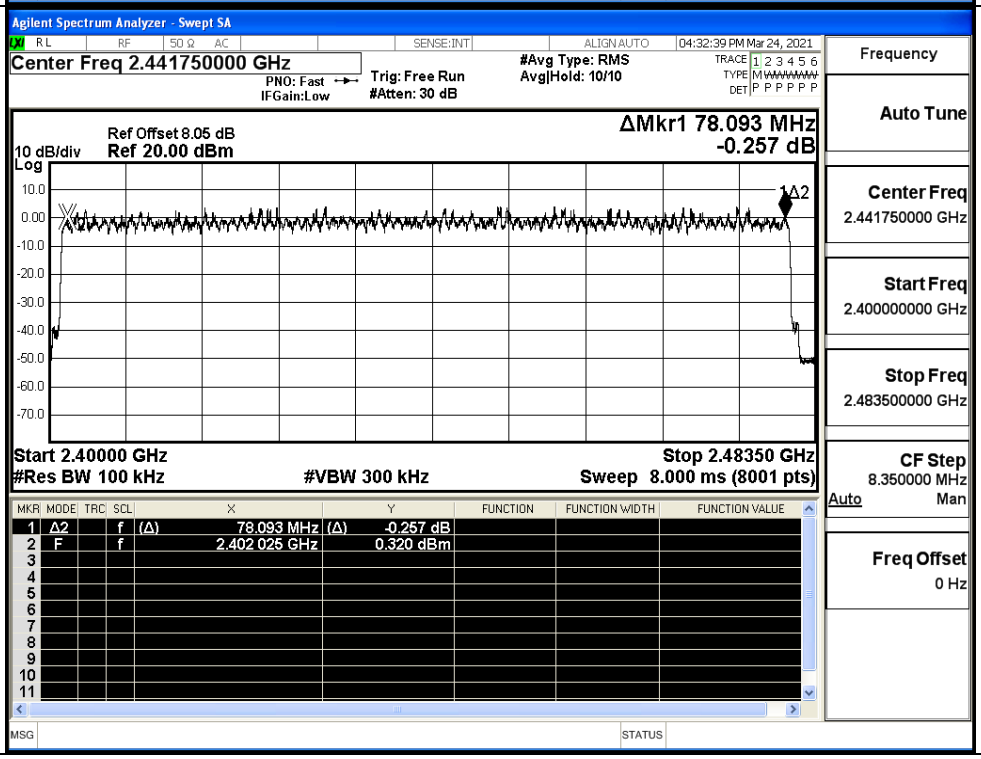


π/4DQPSK/HCH


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.479500000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 10/10
04:30:08 PM Mar 24, 2021
Ref Offset 8.05 dB
10 dB/div
Ref 20.00 dBm
ΔMkr1 1.190 MHz
-0.523 dB
1Δ2
Start 2.478500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.480500 GHz
Sweep 1.000 ms (1001 pts)
1 Δ2 f (Δ) 1.190 MHz (Δ) -0.523 dB
2 F f 2.478 816 GHz 3.500 dBm
Frequency
Auto Tune
Center Freq
2.479500000 GHz
Start Freq
2.478500000 GHz
Stop Freq
2.480500000 GHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz

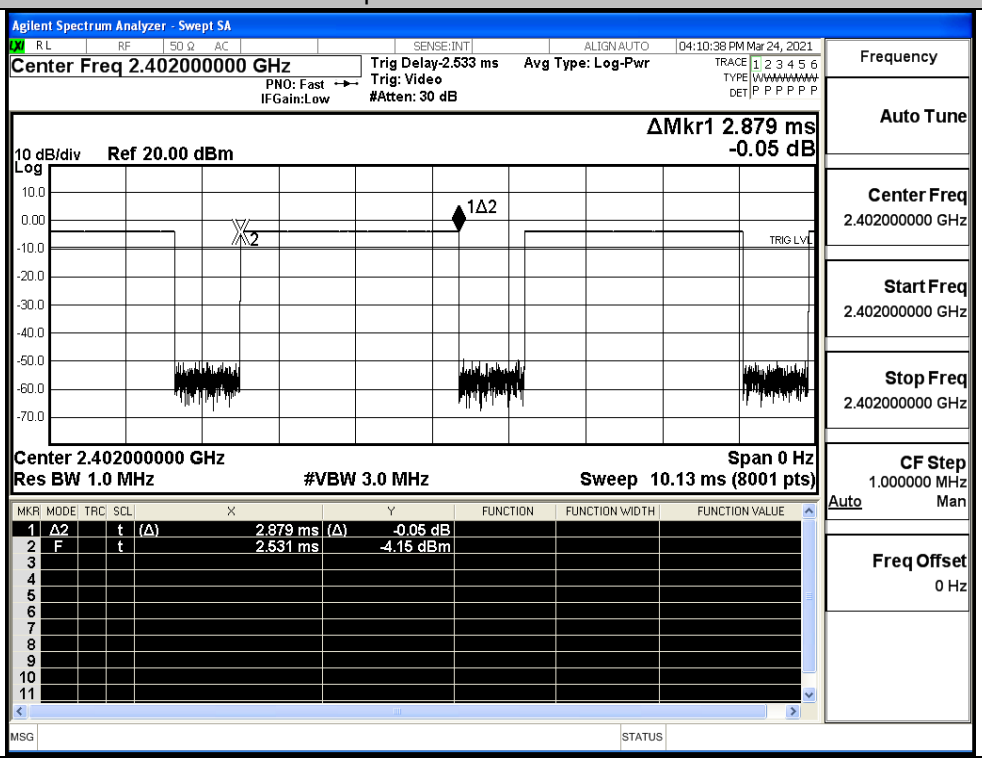
A.4 Hopping Channel Number

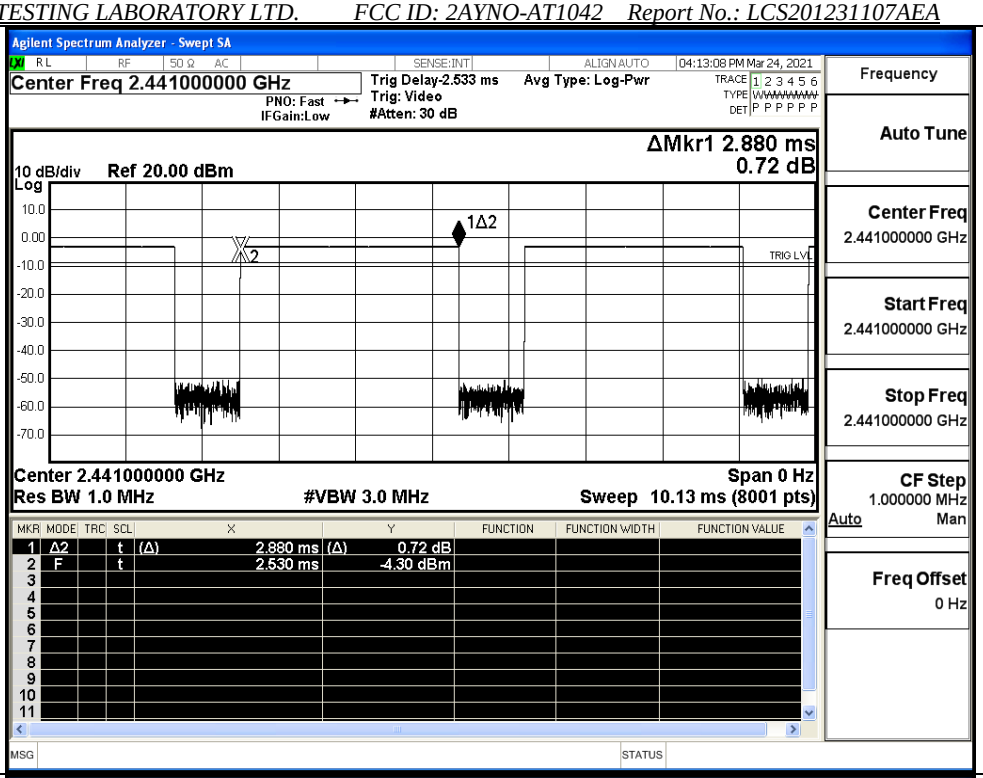
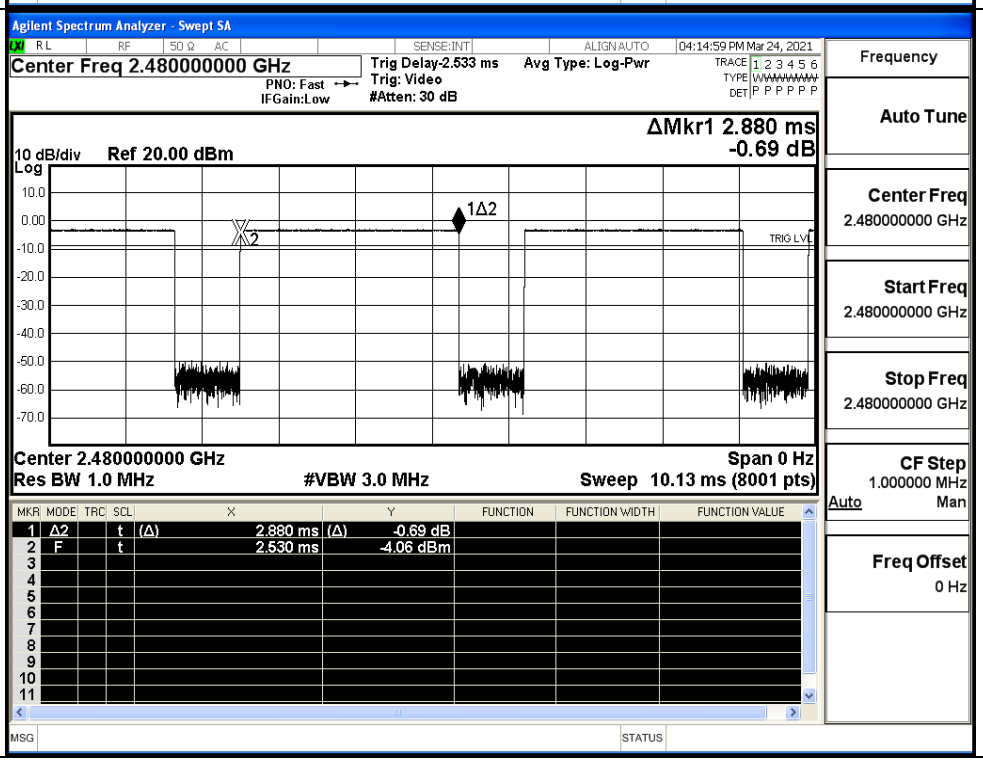
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	>=15	PASS
π/4DQPSK	Hop	79	>=15	PASS

Test Graphs	
GFSK/Hop	
π/4DQPSK/Hop	

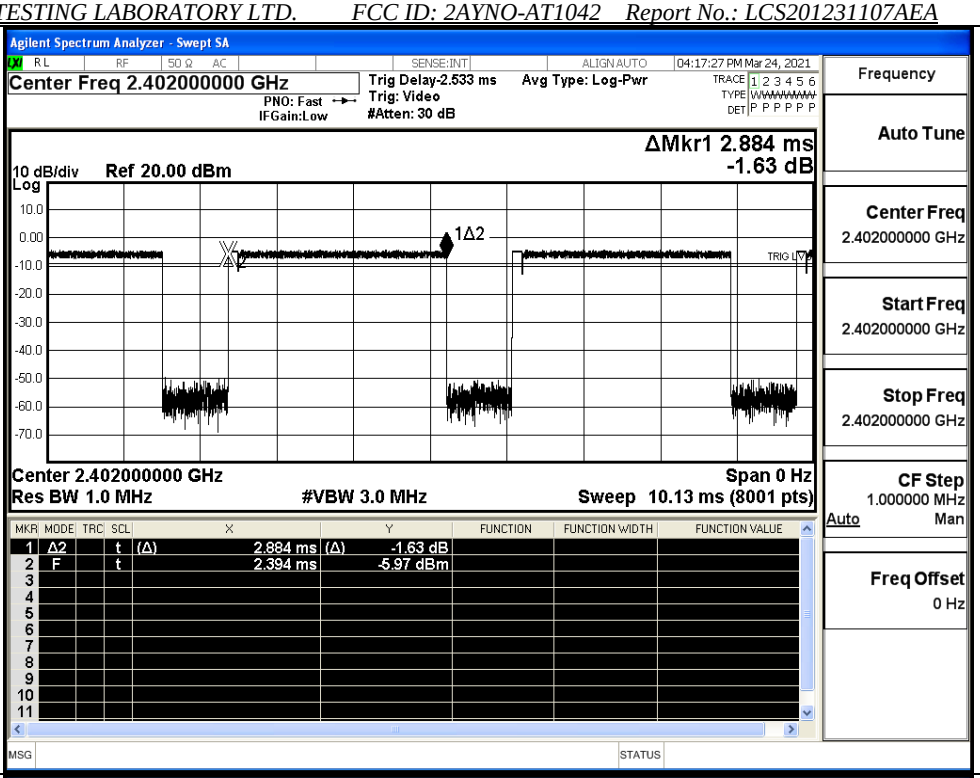
A.5 Dwell Time

Mode	Packet	Channel	Burst Width [ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit [s]	Verdict
GFSK	DH5	LCH	2.88	106.7	0.307	0.4	PASS
	DH5	MCH	2.88	106.7	0.307	0.4	PASS
	DH5	HCH	2.88	106.7	0.307	0.4	PASS
π/4DQPSK	2DH5	LCH	2.88	106.7	0.307	0.4	PASS
	2DH5	MCH	2.88	106.7	0.307	0.4	PASS
	2DH5	HCH	2.88	106.7	0.307	0.4	PASS

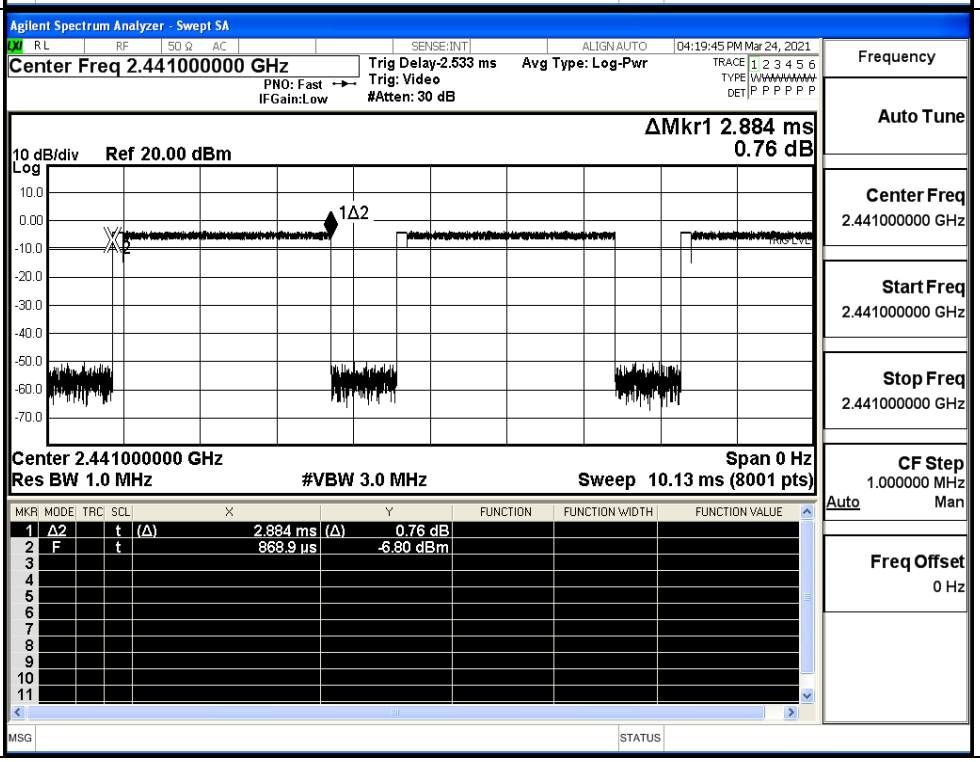
Test Graphs	
GFSK_DH5/LCH	

GFSK_DH5/MCH	
GFSK_DH5/HCH	

π/4DQPSK
_2DH5/LCH

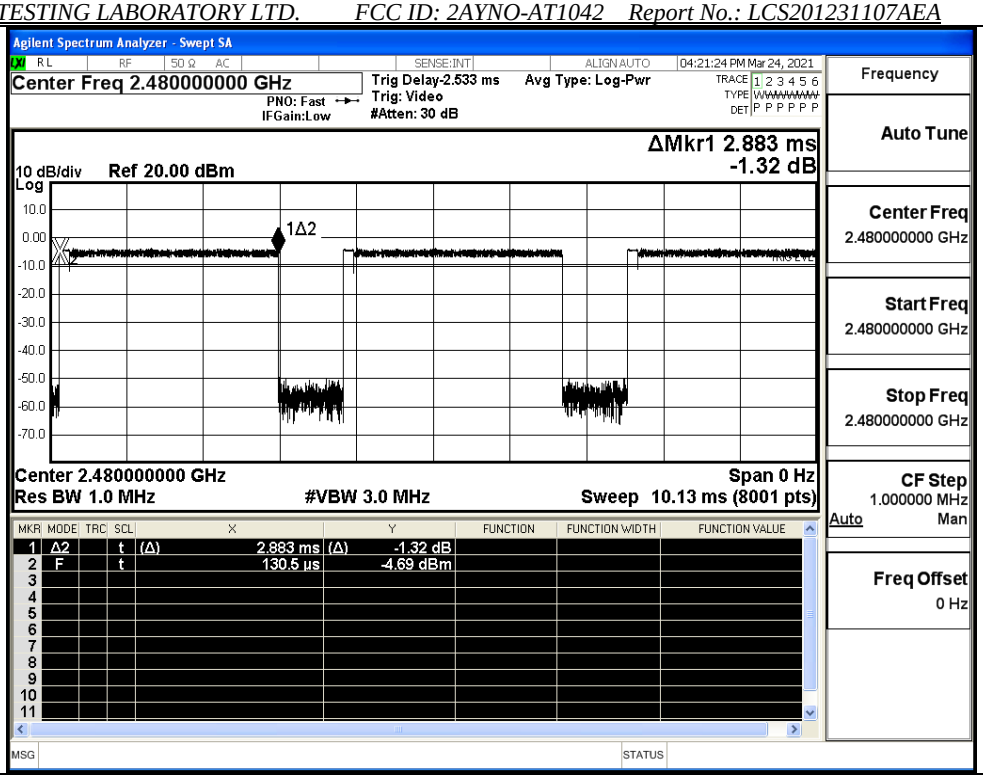


π/4DQPSK
_2DH5/MCH



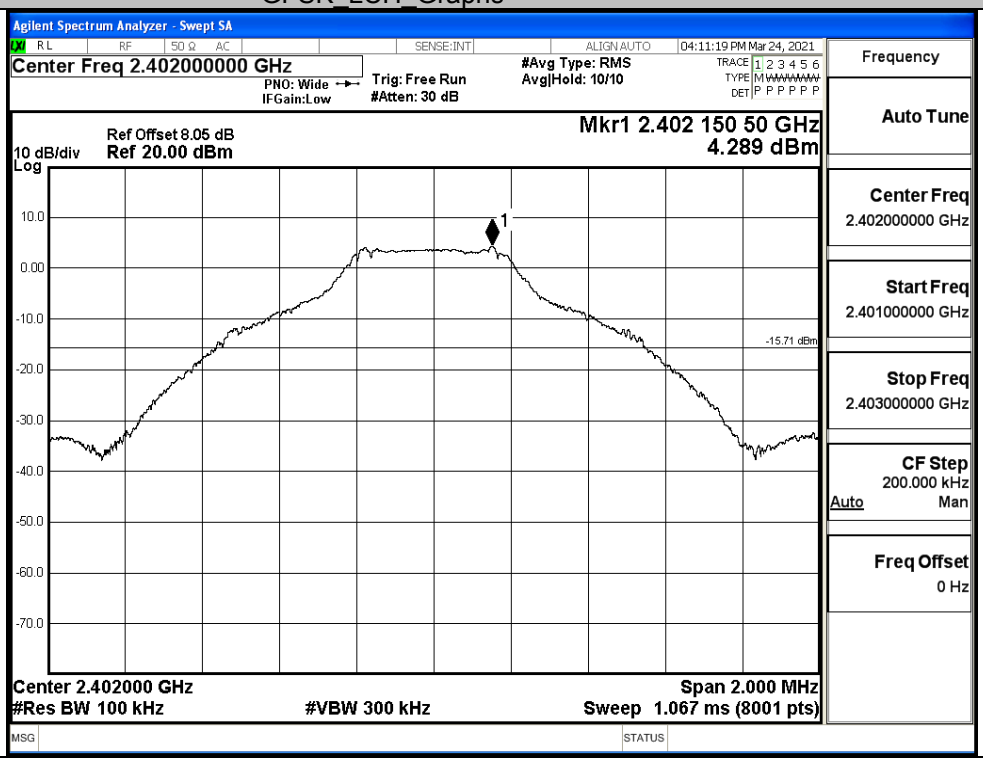
π/4DQPSK

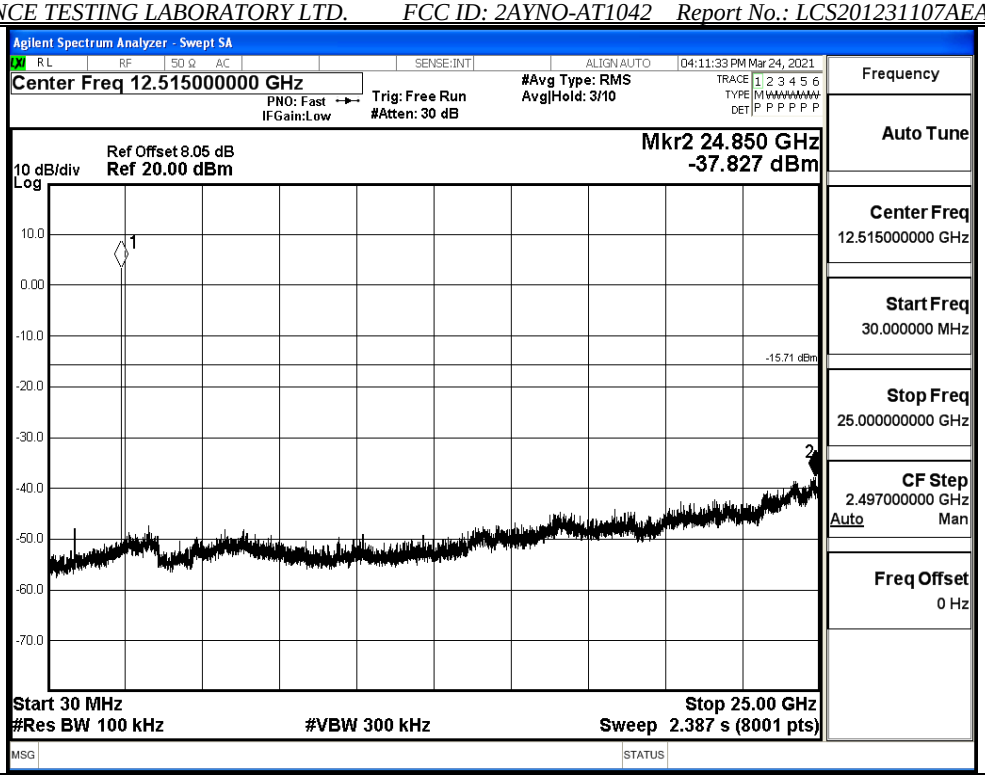
_2DH5/HCH



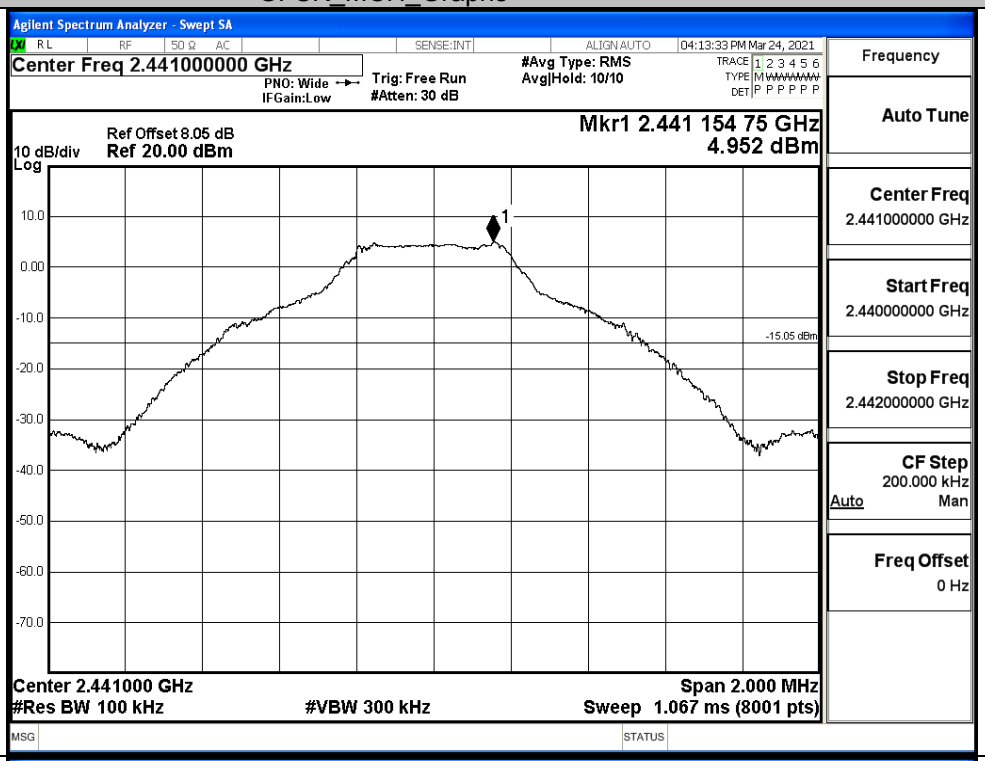
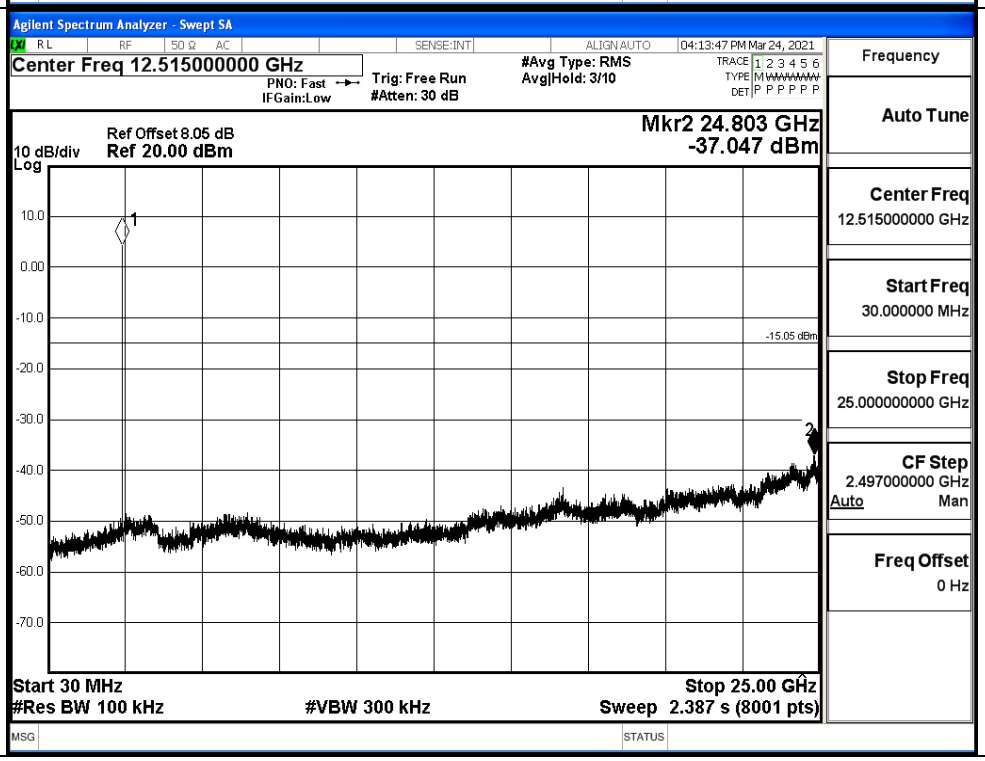
A.6 RF Conducted Spurious Emissions

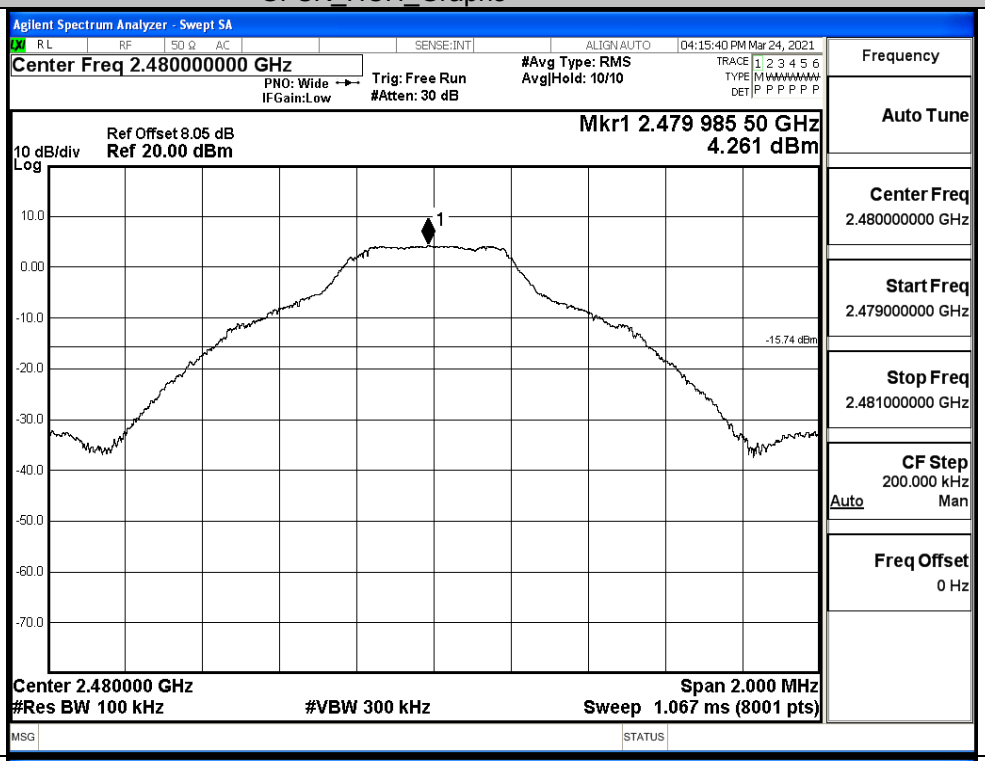
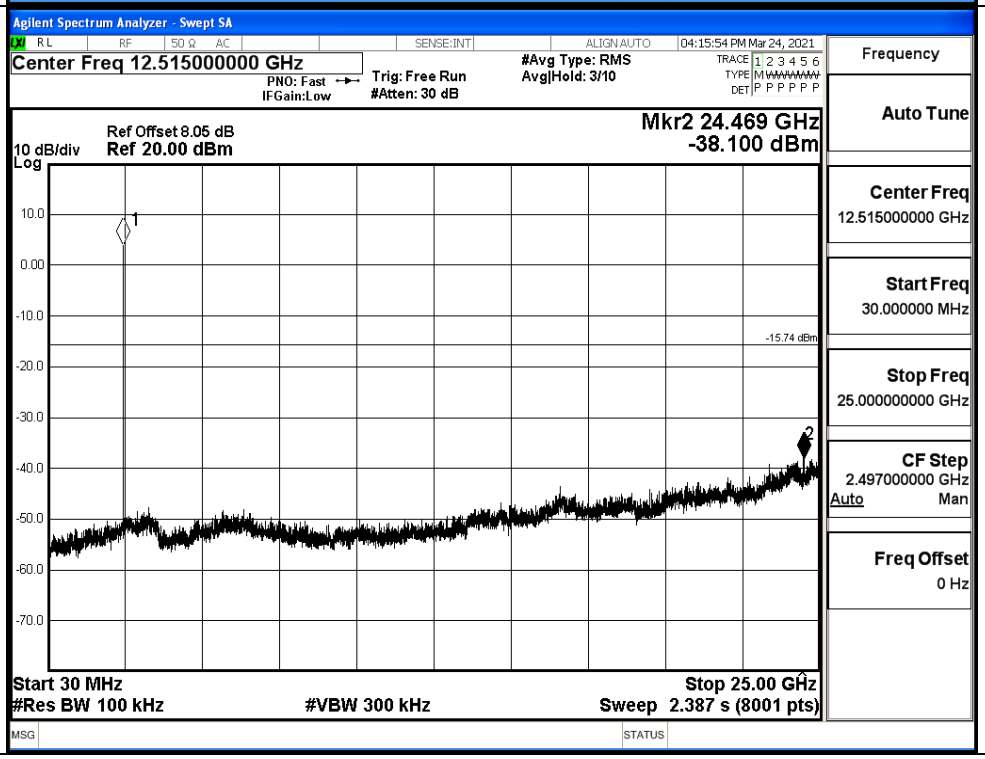
Mode	Channel	Pref [dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	4.289	-37.827	-15.711	PASS
	MCH	4.952	-37.047	-15.048	PASS
	HCH	4.261	-38.100	-15.739	PASS
π/4DQPSK	LCH	3.33	-36.545	-16.670	PASS
	MCH	3.982	-38.044	-16.018	PASS
	HCH	3.814	-37.953	-16.186	PASS

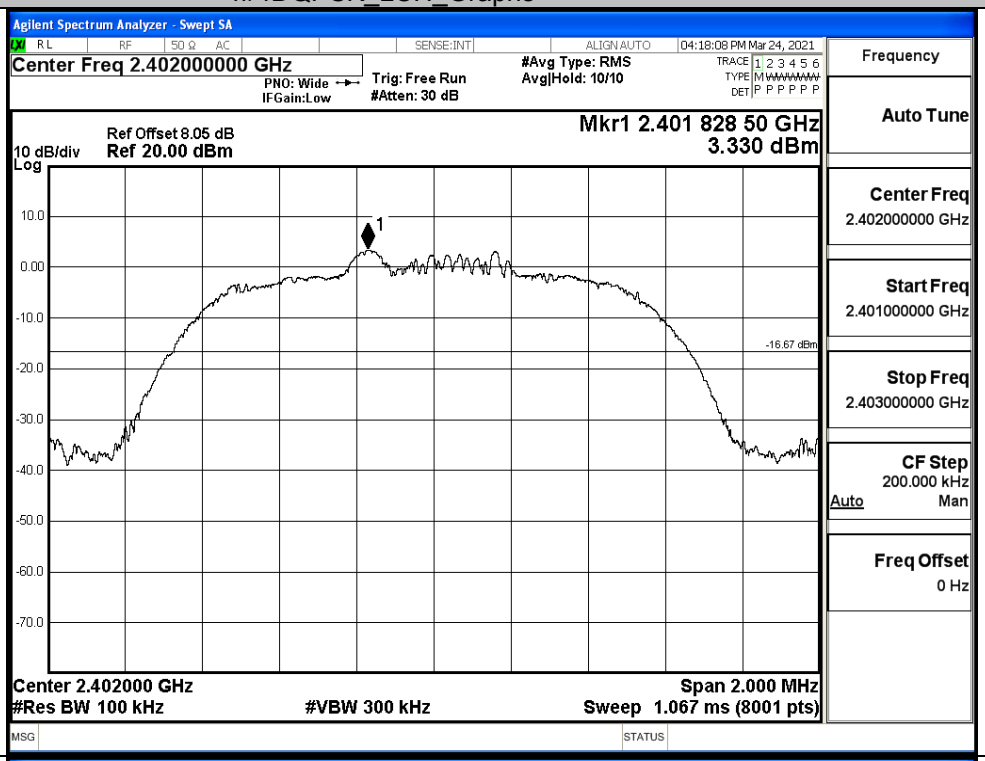
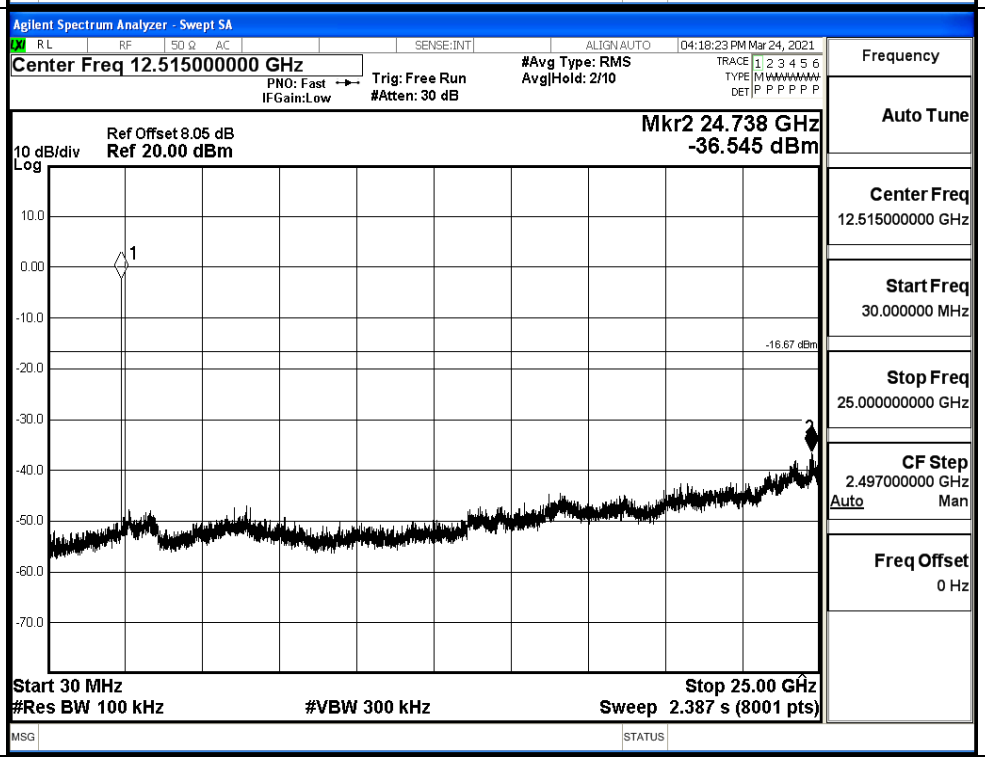
GFSK_LCH_Graphs		
Pref		

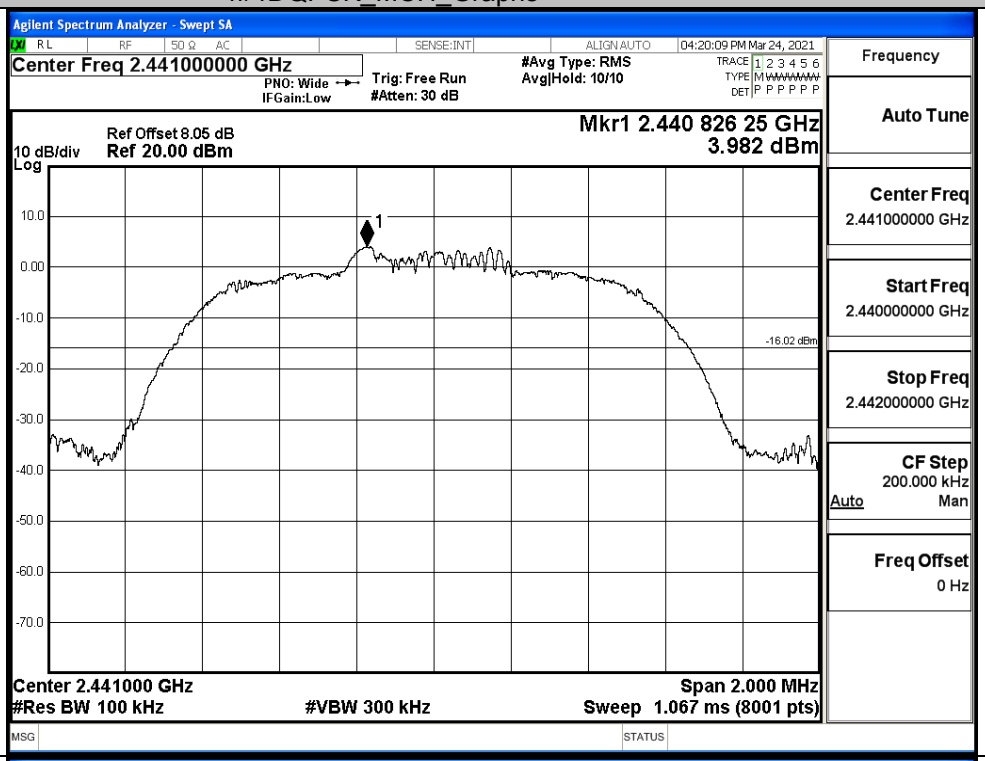
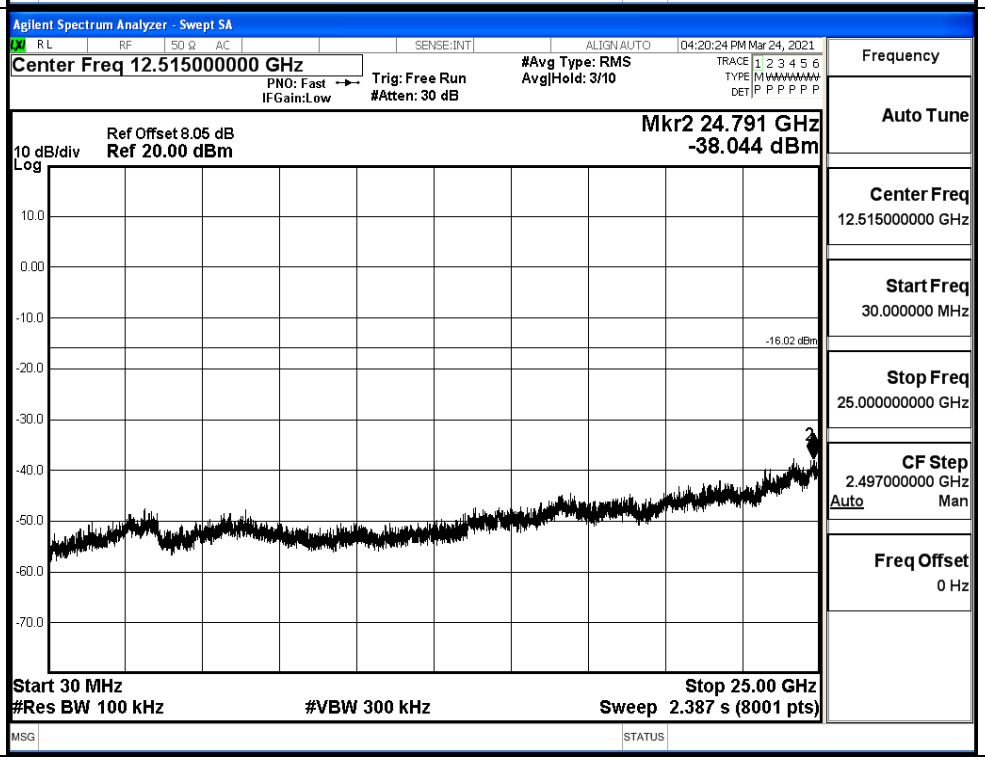
Puw		

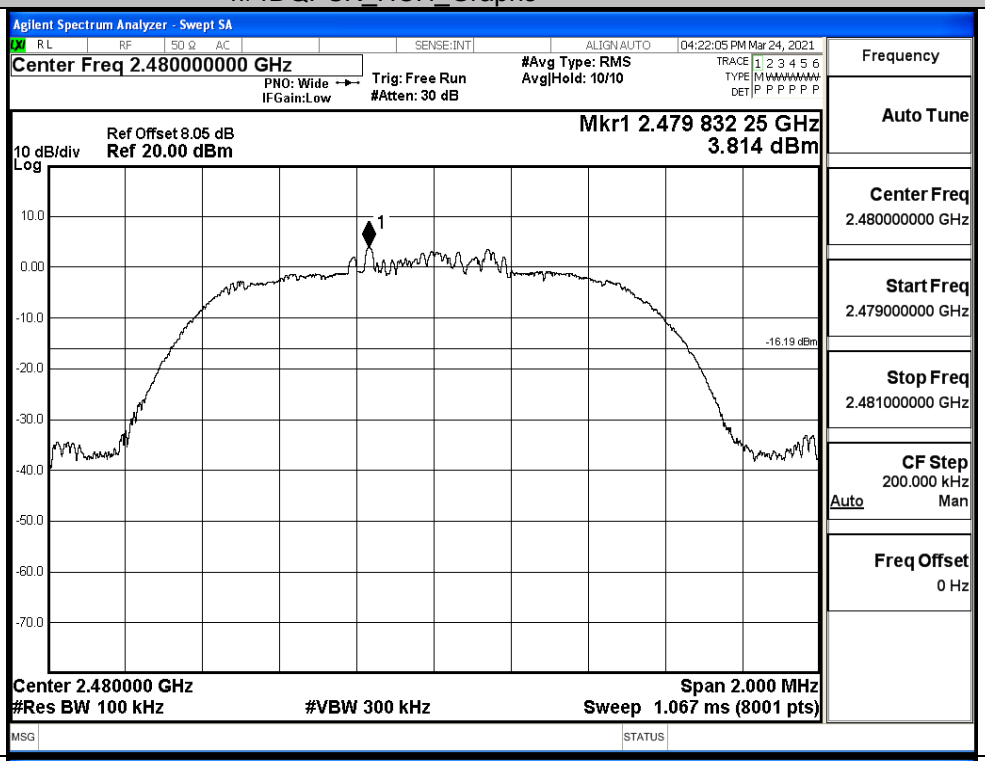
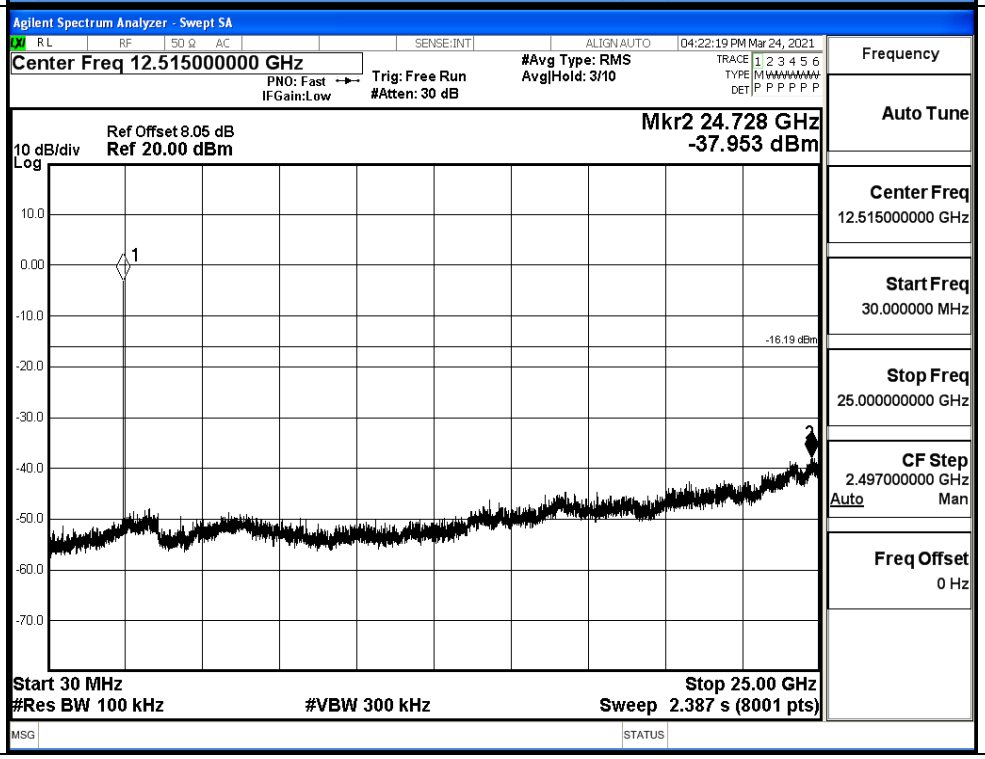
Agilent Spectrum Analyzer - Swept SA
Center Freq 12.515000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 3/10
04:11:33 PM Mar 24, 2021
Ref Offset 8.05 dB
10 dB/div
Ref 20.00 dBm
Log
Mkr2 24.850 GHz
-37.827 dBm
-15.71 dBm
Start 30 MHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 25.00 GHz
Sweep 2.387 s (8001 pts)
Frequency
Auto Tune
Center Freq
12.515000000 GHz
Start Freq
30.000000 MHz
Stop Freq
25.000000000 GHz
CF Step
2.497000000 GHz
Auto
Man
Freq Offset
0 Hz

GFSK_MCH_Graphs			
Pref			
Puw			

GFSK_HCH_Graphs			
Pref			
Puw			

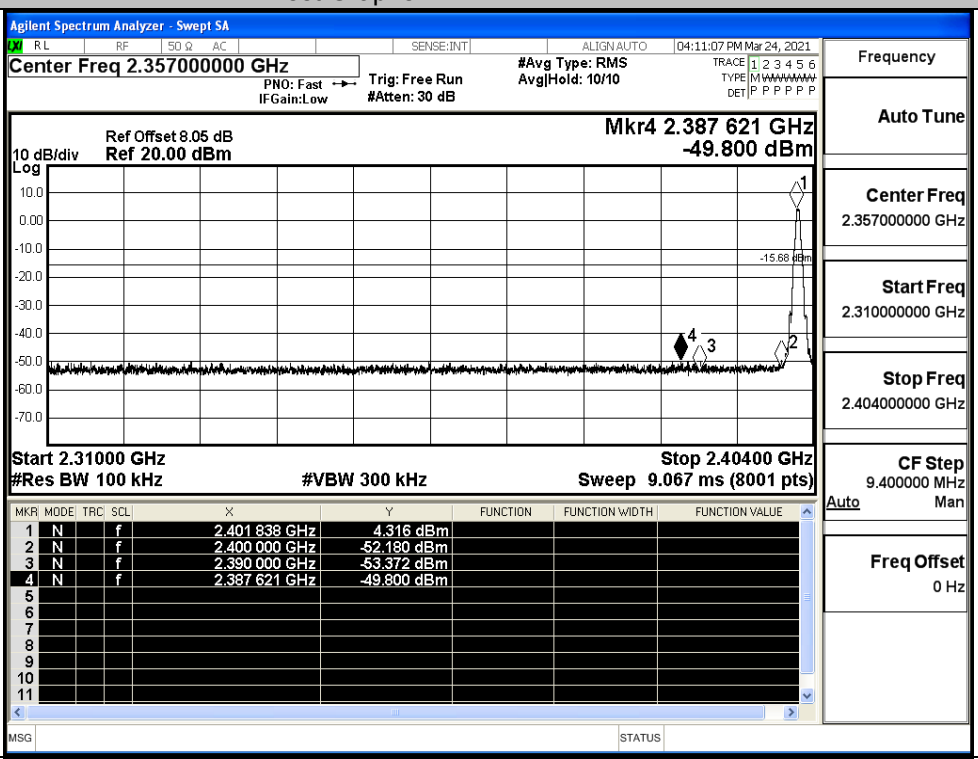
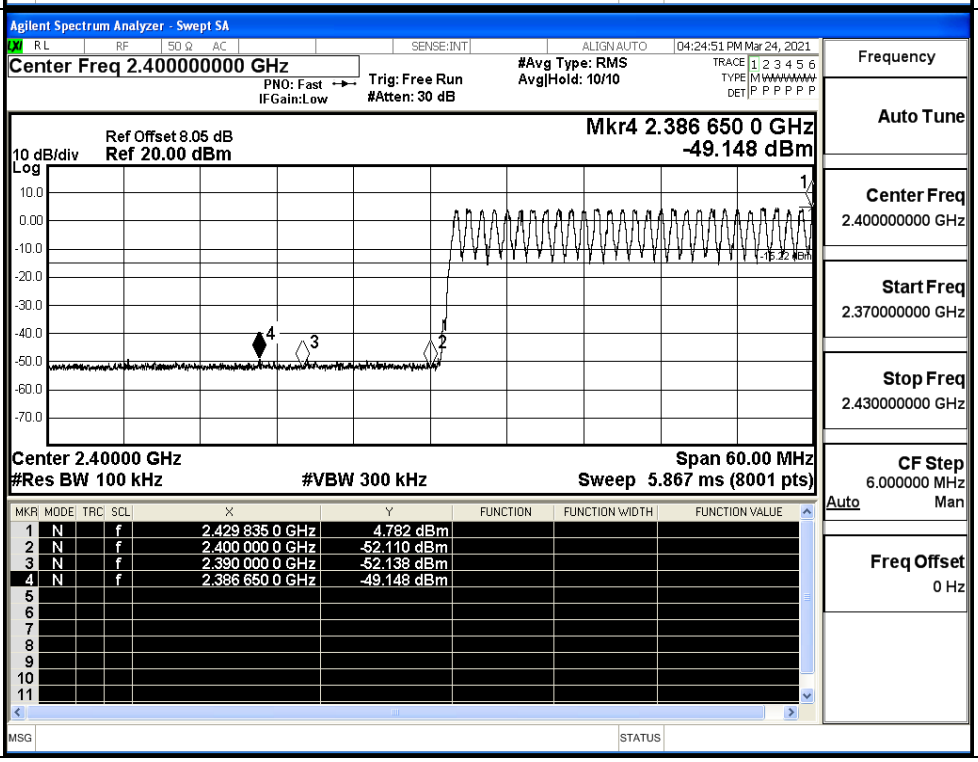
π/4DQPSK_LCH_Graphs			
Pref			
Puw			

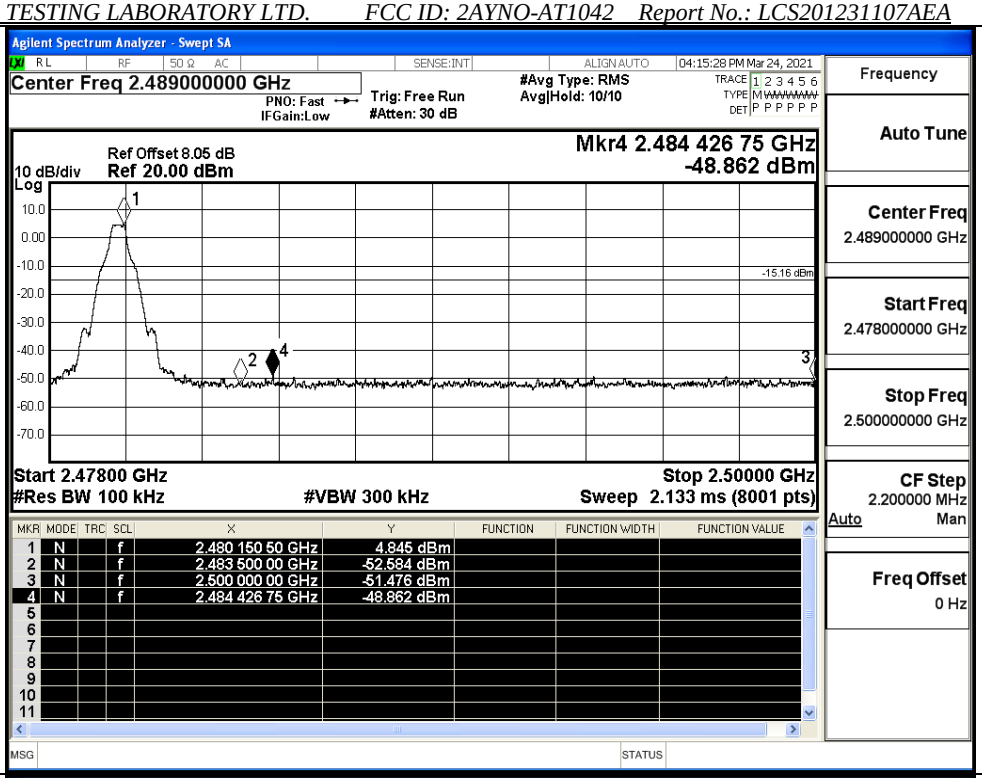
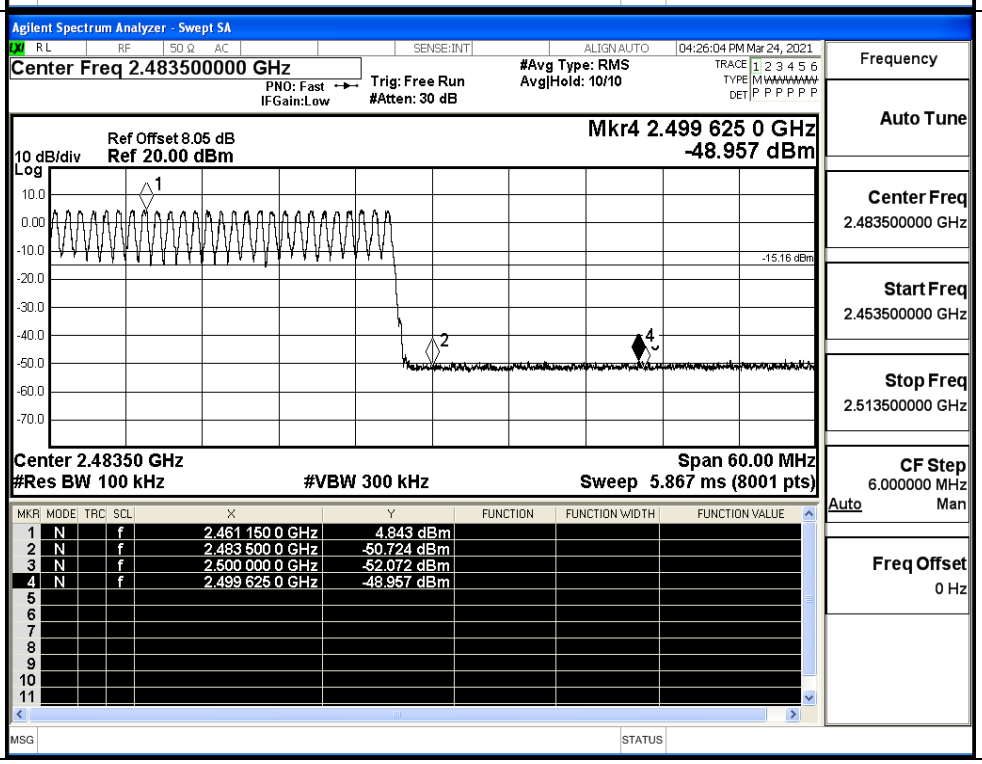
π/4DQPSK_MCH_Graphs			
Pref			
Puw			

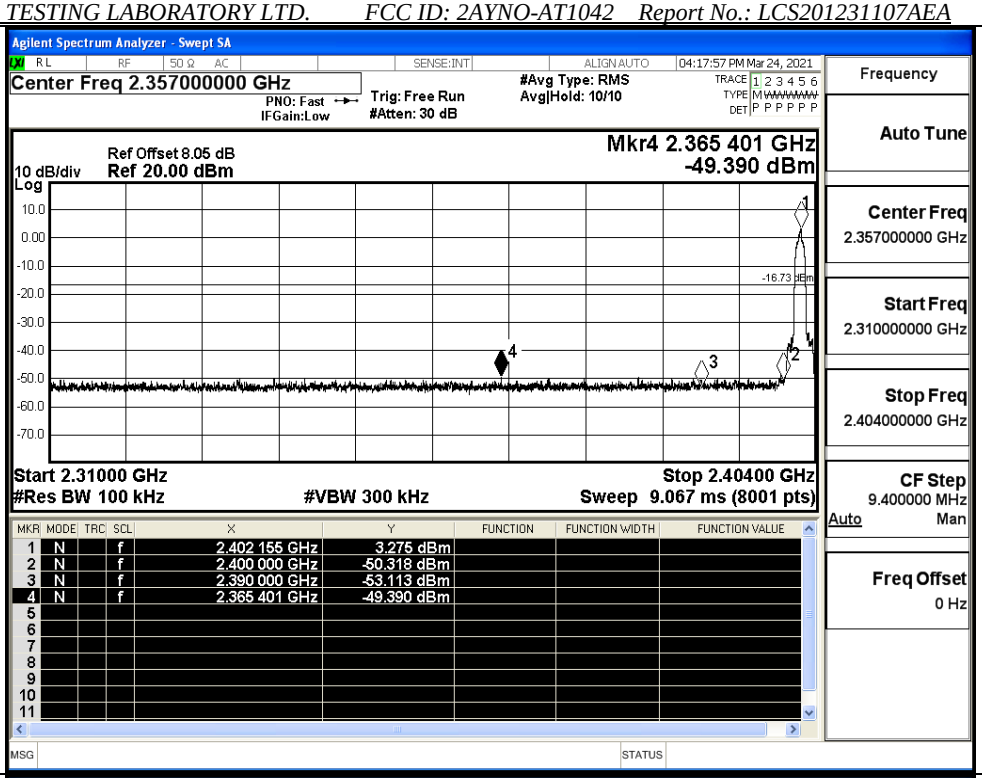
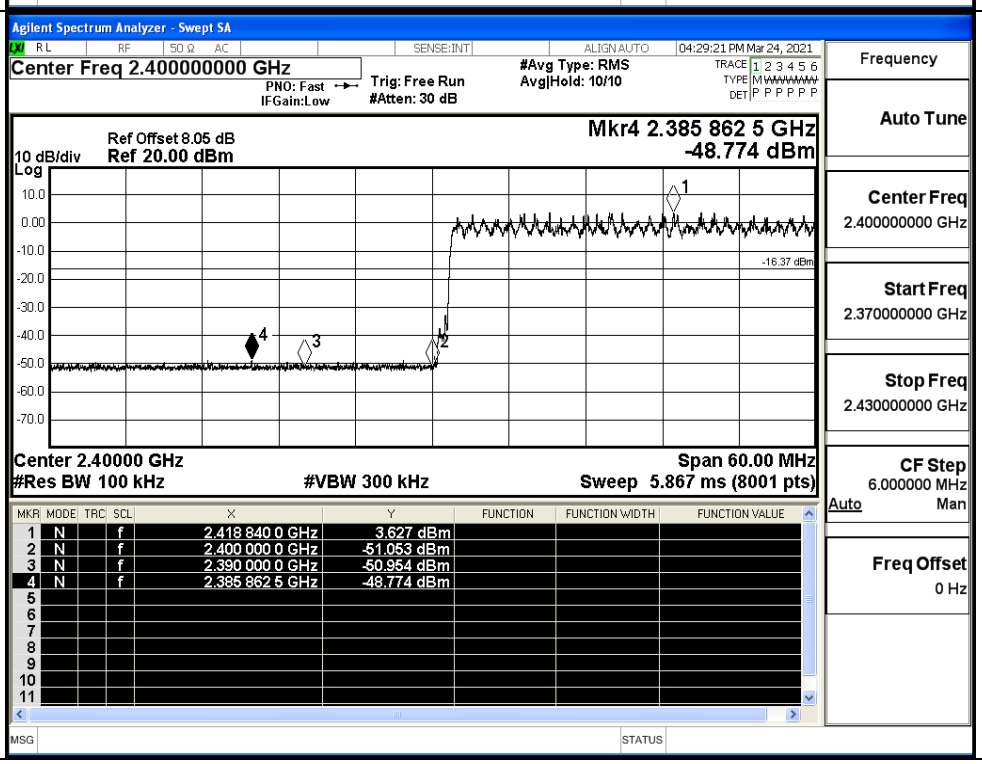
π/4DQPSK_HCH_Graphs			
Pref			
Puw			

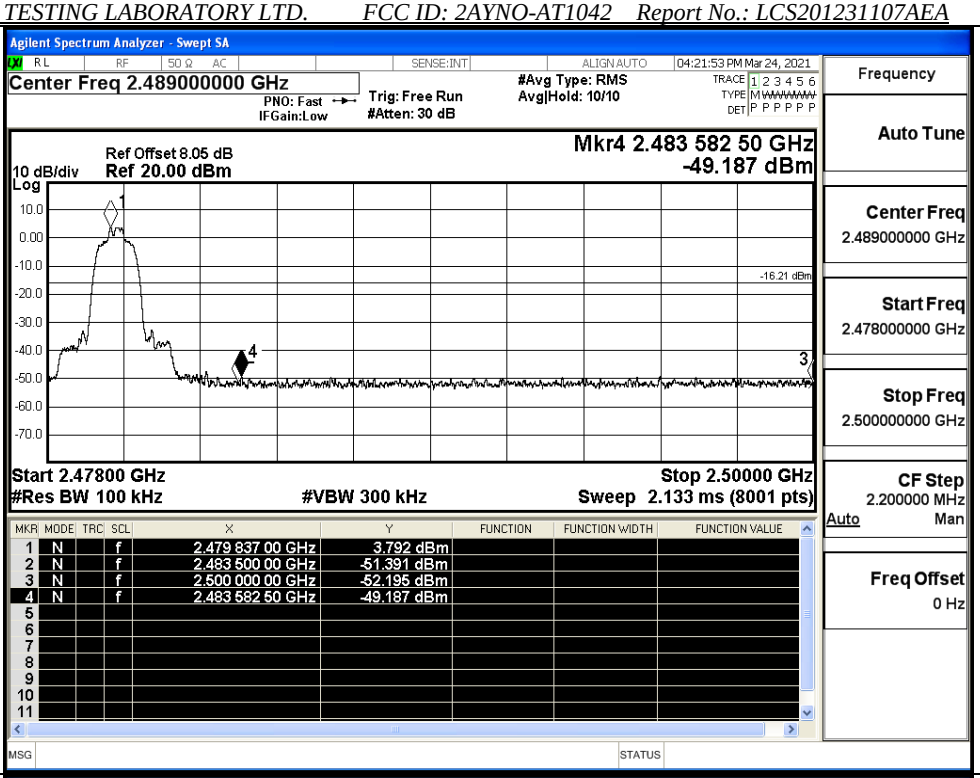
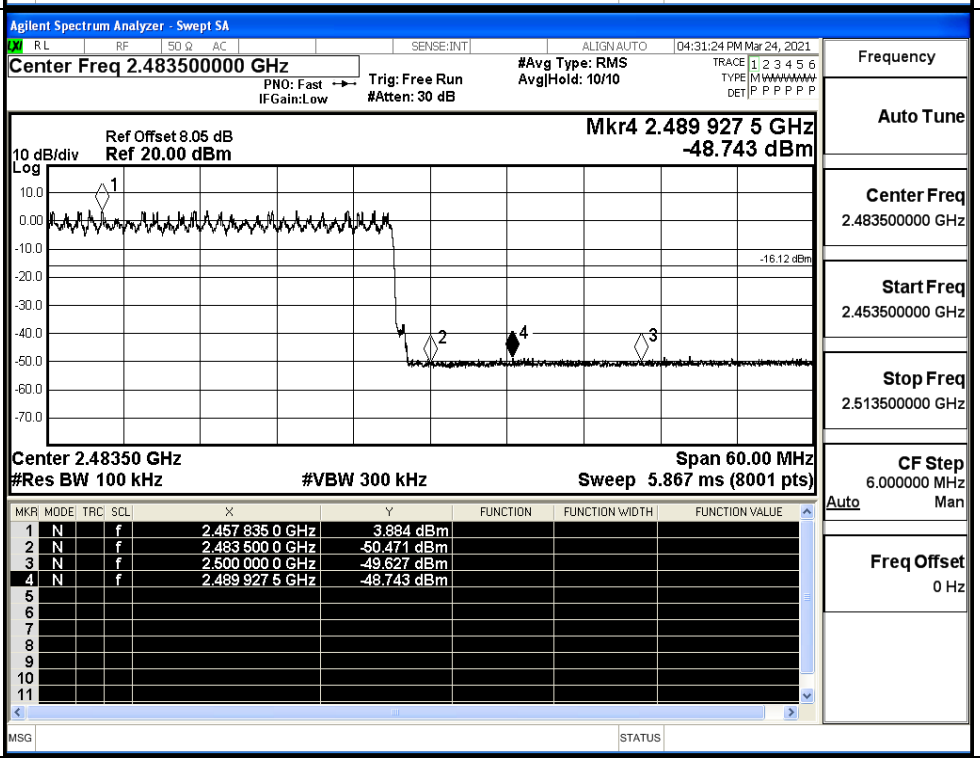
A.7 Band-edge for RF Conducted Emissions

Mode	Channel	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max Spurious Level [dBm]	Limit [dBm]	Verdict
GFSK	LCH	2402	4.316	Off	-49.800	-15.68	PASS
			4.782	On	-49.148	-15.22	PASS
	HCH	2480	4.845	Off	-48.862	-15.16	PASS
			4.843	On	-48.957	-15.16	PASS
π/4DQPSK	LCH	2402	3.275	Off	-49.390	-16.73	PASS
			3.627	On	-48.774	-16.37	PASS
	HCH	2480	3.792	Off	-49.187	-16.21	PASS
			3.884	On	-48.743	-16.12	PASS

Test Graphs	
GFSK/LCH/No Hop	
GFSK/LCH/Hop	

GFSK/HCH/No Hop	
GFSK/HCH/Hop	

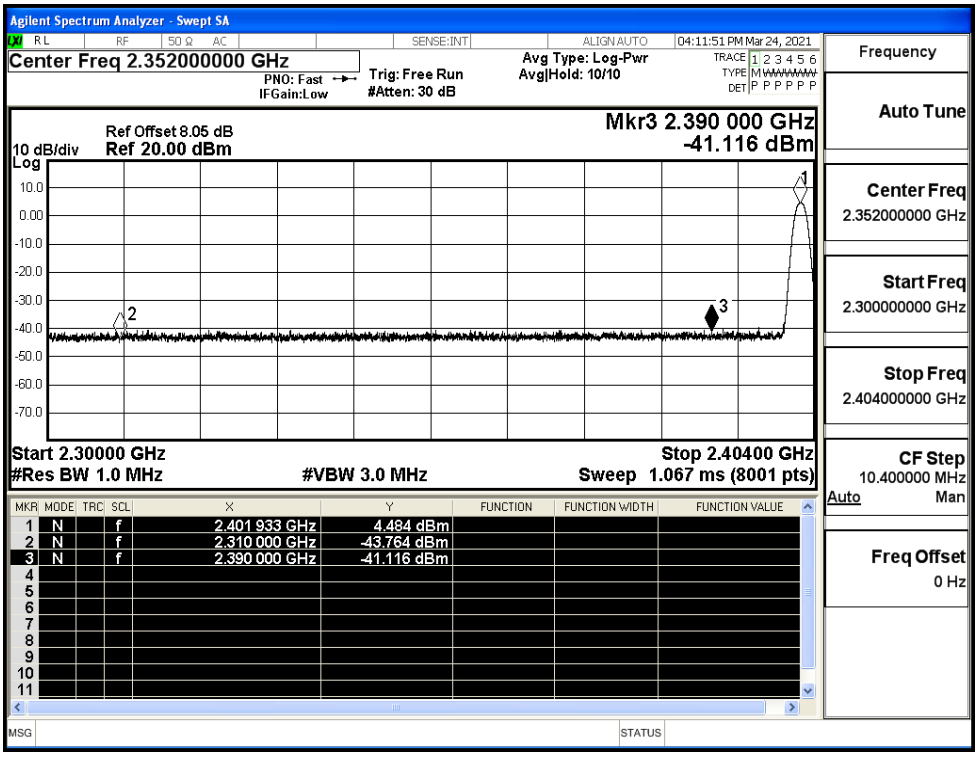
π/4DQPSK/LCH/No Hop	
π/4DQPSK/LCH/Hop	

π/4DQPSK/HCH/No Hop	
π/4DQPSK/HCH/Hop	

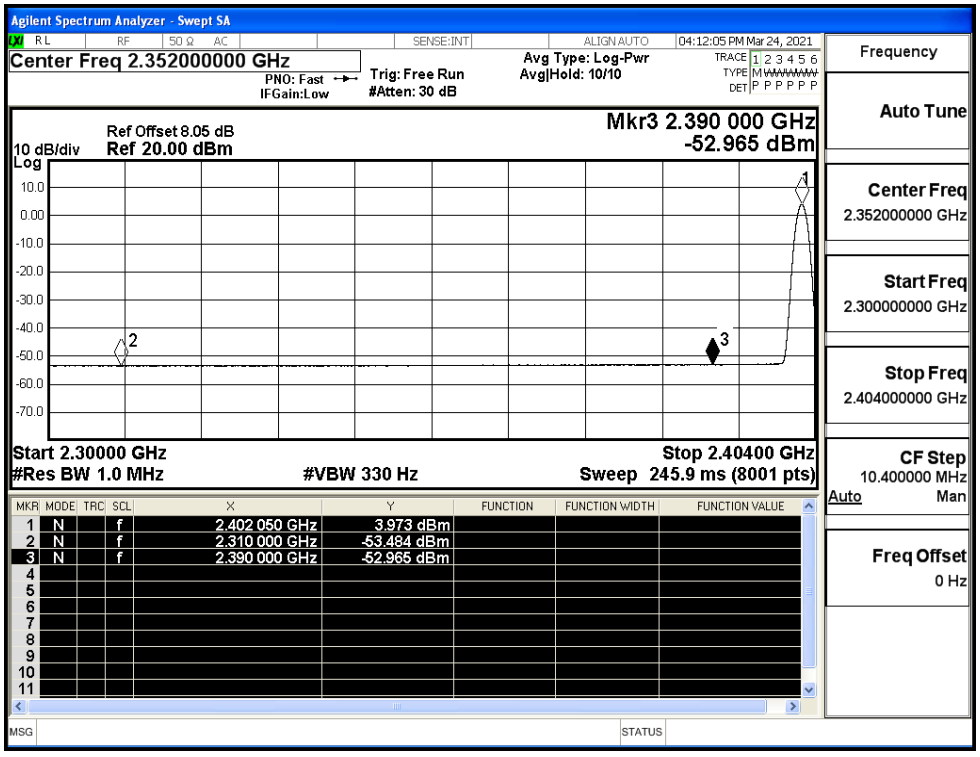
A.8 Restrict-band band-edge measurements

Test Mode	Hopping	Freq.	Power [dBm]	Gain	Ground Factor	E [dBuV/m]	Detector	Limit [dBuV/m]	Verdict
GFSK	Off	2310.0	-43.76	2.0	0	51.49	PEAK	74	PASS
	Off	2310.0	-53.48	2.0	0	41.77	AV	54	PASS
	Off	2390.0	-41.12	2.0	0	54.14	PEAK	74	PASS
	Off	2390.0	-52.97	2.0	0	42.29	AV	54	PASS
	Off	2483.5	-42.95	2.0	0	52.31	PEAK	74	PASS
	Off	2483.5	-52.26	2.0	0	42.99	AV	54	PASS
	Off	2500.0	-42.37	2.0	0	52.89	PEAK	74	PASS
	Off	2500.0	-52.38	2.0	0	42.88	AV	54	PASS
π/4DQPSK	Off	2310.0	-42.01	2.0	0	53.25	PEAK	74	PASS
	Off	2310.0	-53.28	2.0	0	41.98	AV	54	PASS
	Off	2390.0	-42.80	2.0	0	52.46	PEAK	74	PASS
	Off	2390.0	-53.03	2.0	0	42.23	AV	54	PASS
	Off	2483.5	-41.35	2.0	0	53.91	PEAK	74	PASS
	Off	2483.5	-52.32	2.0	0	42.94	AV	54	PASS
	Off	2500.0	-42.80	2.0	0	52.46	PEAK	74	PASS
	Off	2500.0	-52.41	2.0	0	42.84	AV	54	PASS

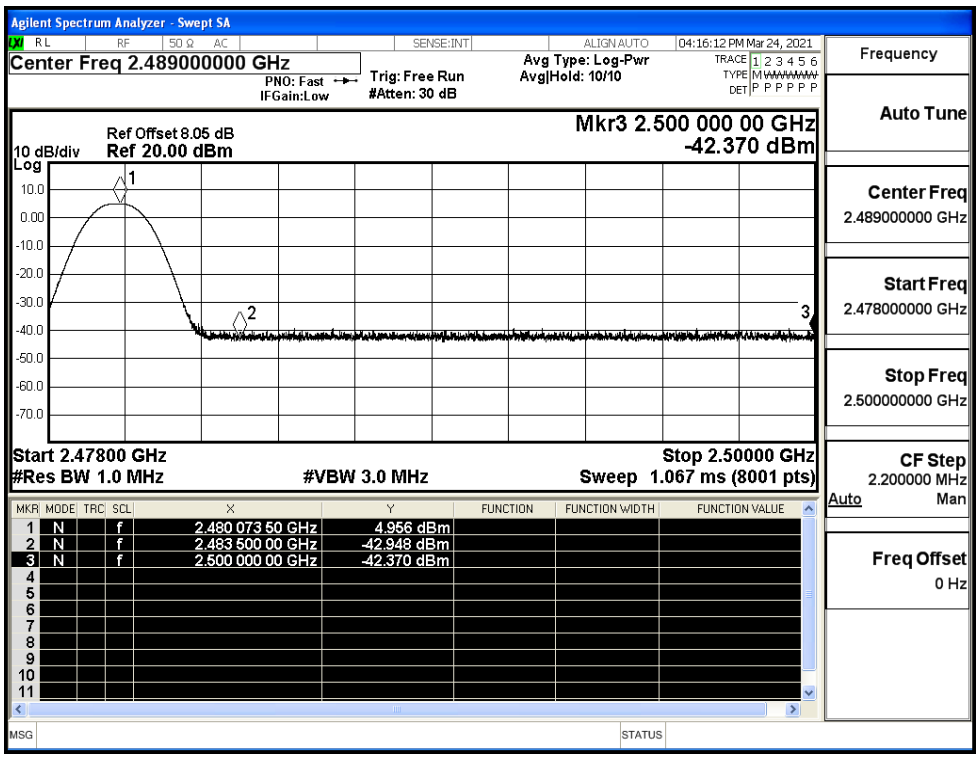
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (Low Channel)



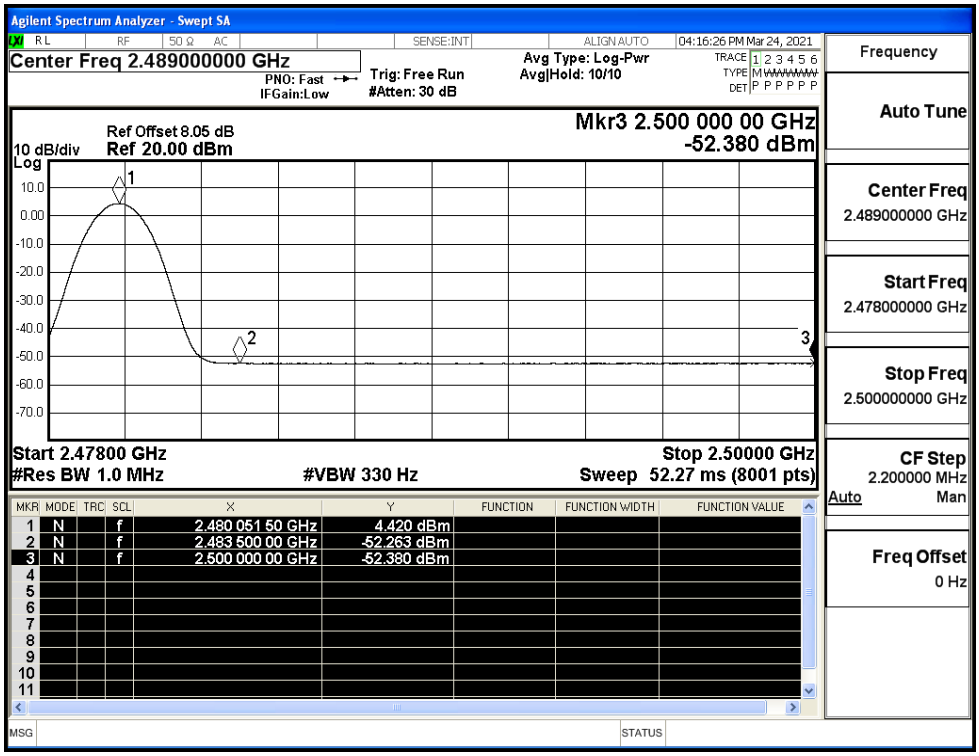
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (Low Channel)



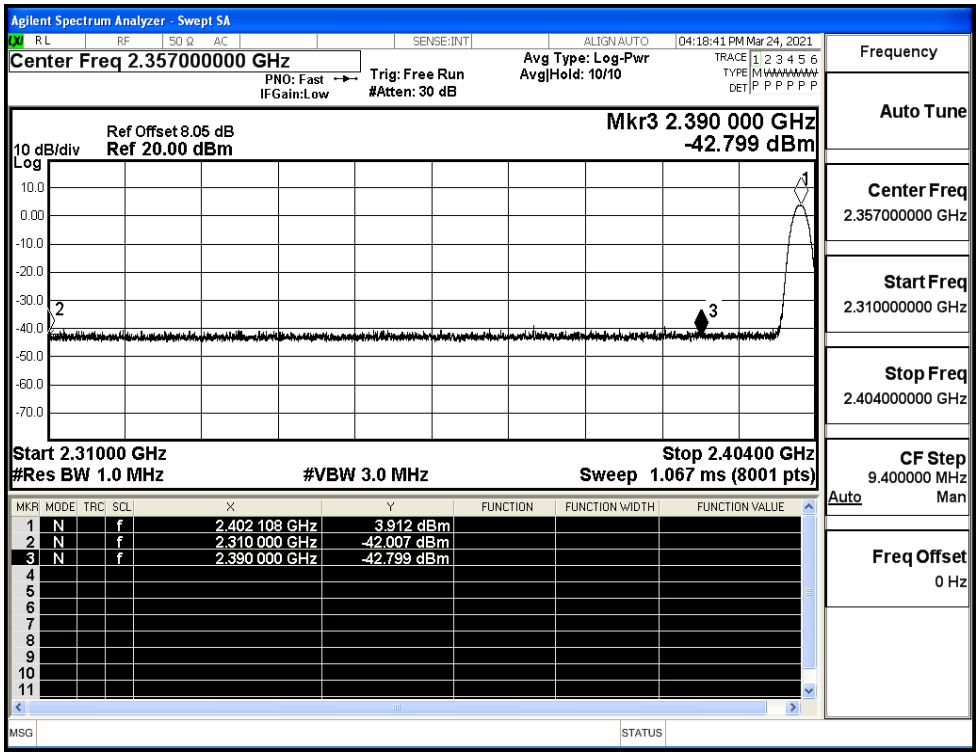
Restrict-band band-edge measurements_Hopping Off_ GFSK_PEAK (High Channel)



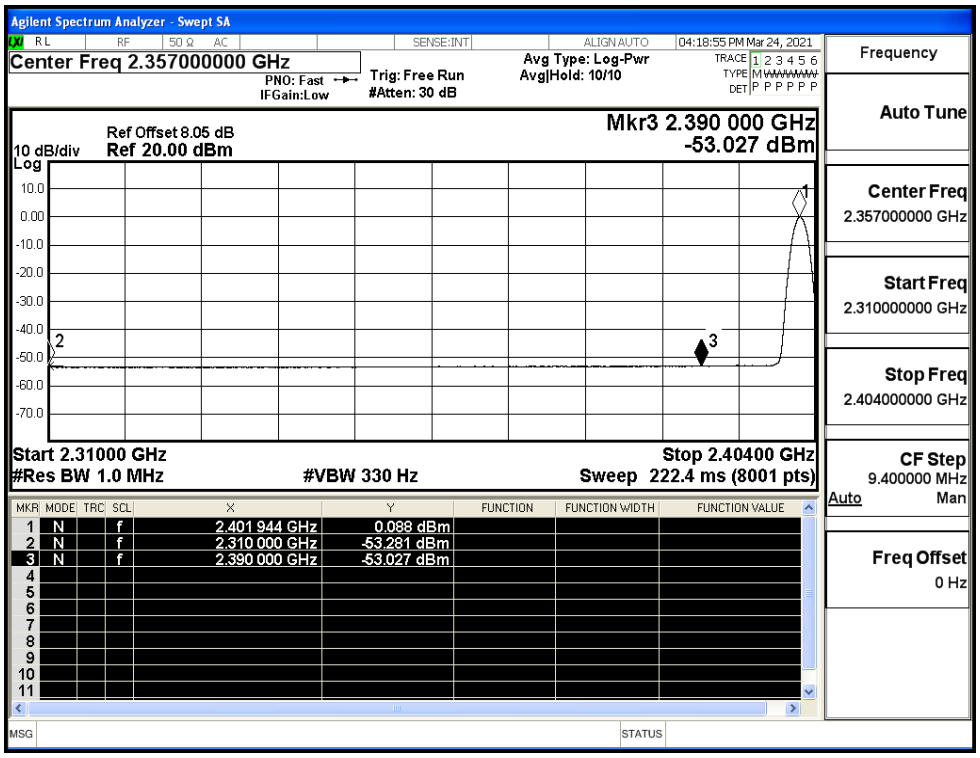
Restrict-band band-edge measurements_Hopping Off_ GFSK_Average (High Channel)



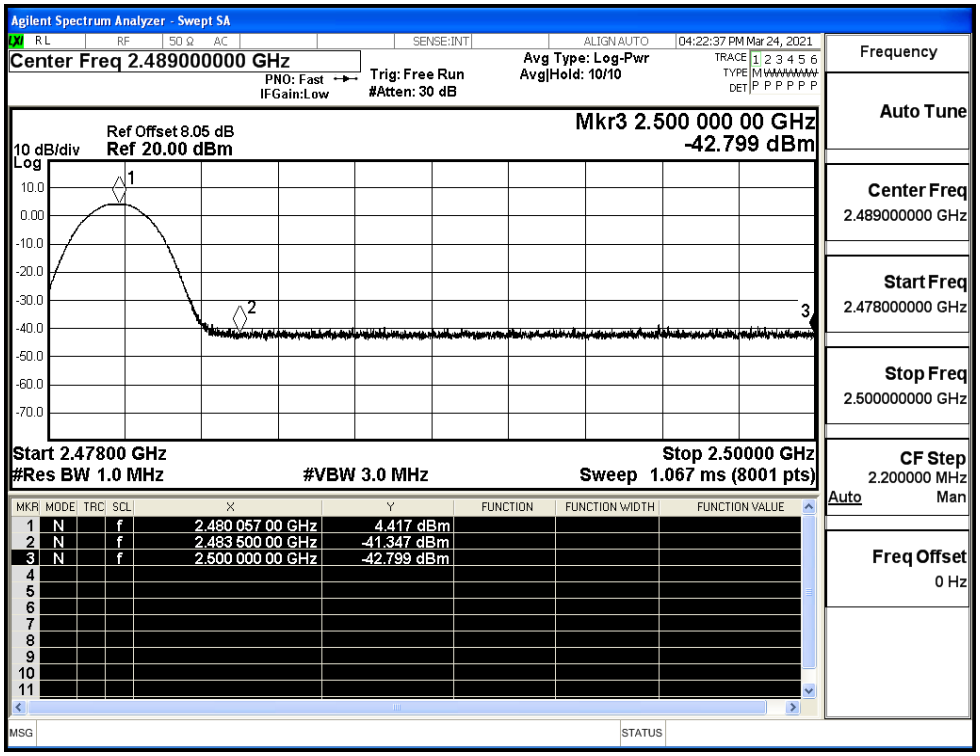
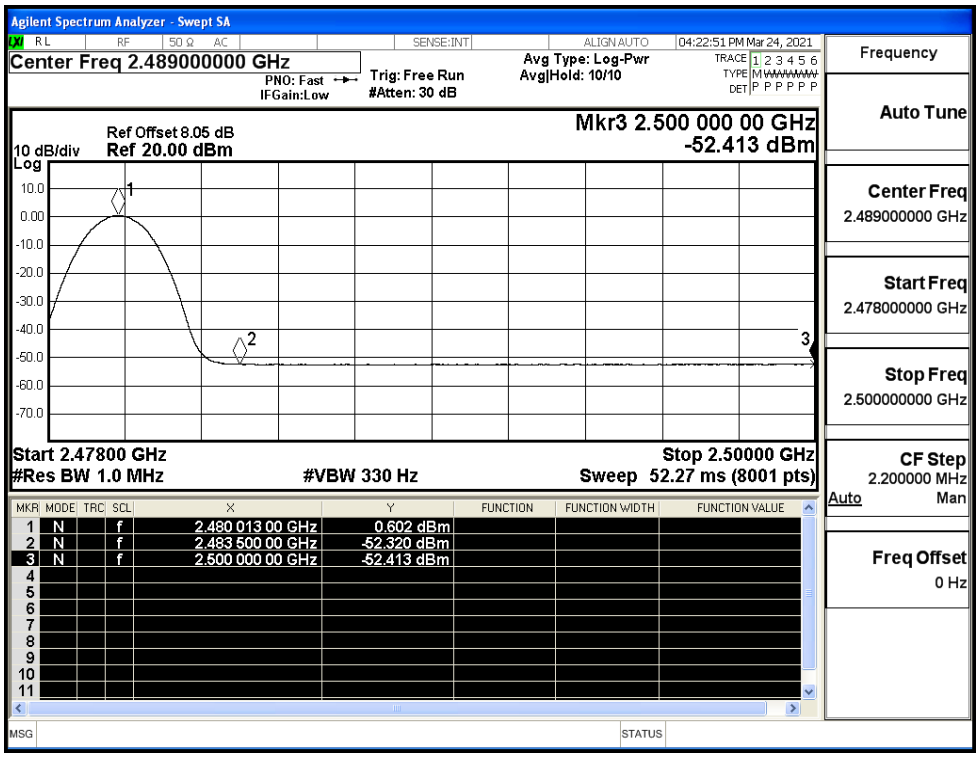
Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (Low Channel)



Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (Low Channel)



Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_PEAK (High Channel)



Restrict-band band-edge measurements_Hopping Off_π/4-DQPSK_Average (High Channel)